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AUTHORITY

**CNO [N772] ltr N772A/6U875630, 20 Jan  
2006, ONR ltr, 31 Jan 2006**

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AUTHORITY

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MC REPORT 011  
Volume 13

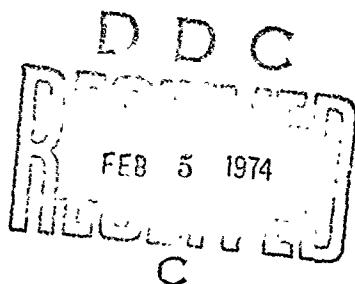
ACOUSTIC ENVIRONMENTAL SCENARIOS  
AND  
PREDICTIONS FOR ASW

VOLUME 13  
AREA 4B, SUMMER  
PREDICTIONS FOR PASSIVE SONAR

October 1972

AT 916610Z

LONG RANGE ACOUSTIC PROPAGATION PROJECT



OCEAN SCIENCE PROGRAM  
MAURY CENTER FOR OCEAN SCIENCE  
Department of the Navy  
Washington, D.C.

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Test and Evaluation; 6 FEB 1974 Other requests  
for this document must be referred to

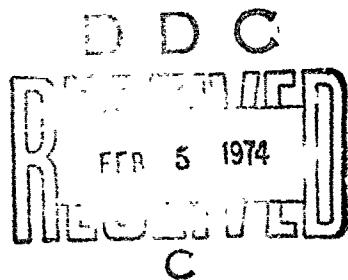
Director, Long Range Acoustic Propagation Project (ONR Code 102-OS).

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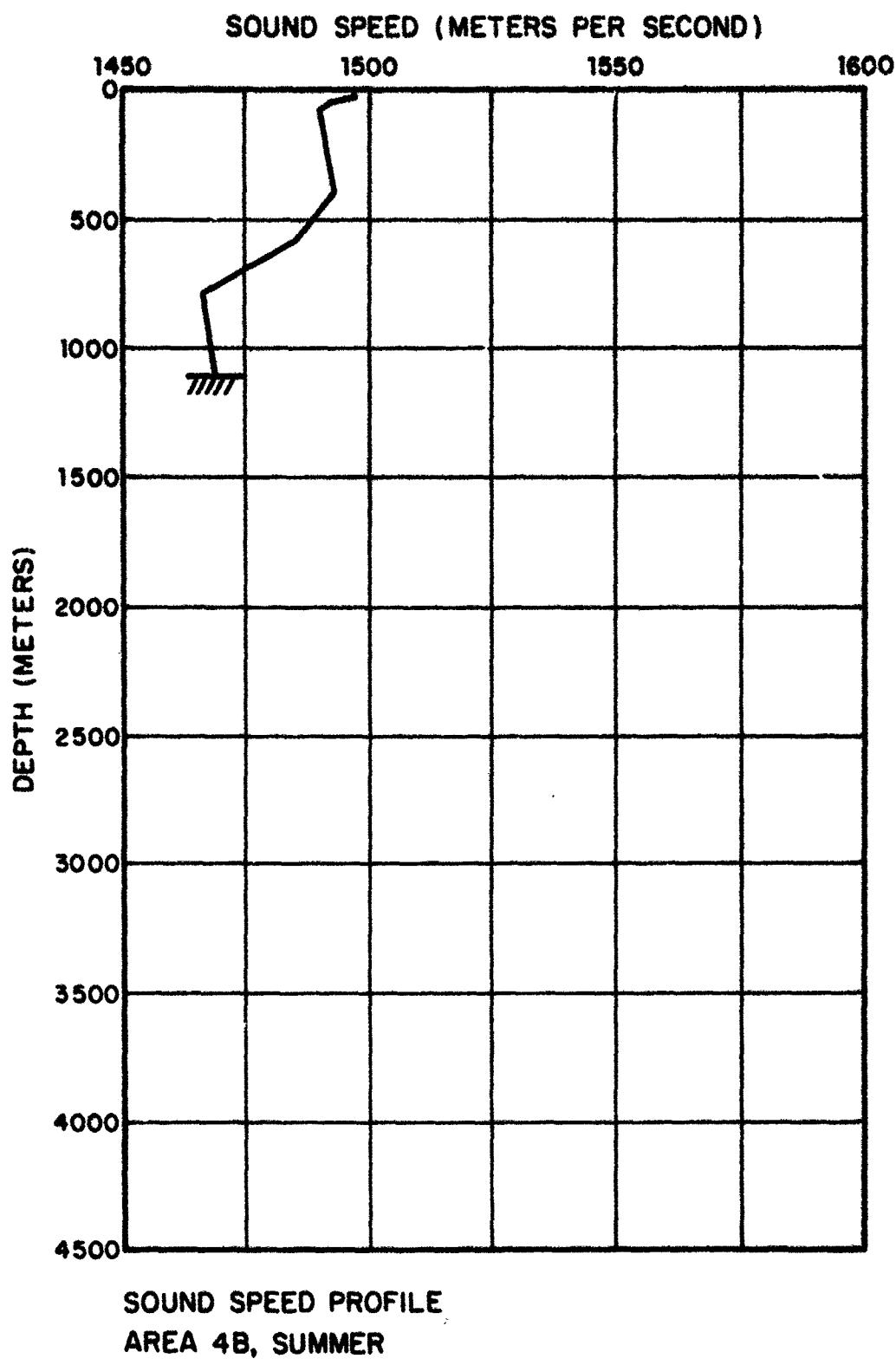
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JUSTIFICATION	<input type="checkbox"/>
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DATE	REF ID: <i>2000</i> and, or SPECIAL

ACOUSTIC ENVIRONMENTAL SCENARIOS AND PREDICTIONS  
FOR ASW

Volume XIII: Area 4B SUMMER  
PREDICTIONS FOR PASSIVE SONAR



Refer to Volume 1 of this report for an explanation of the plot format and descriptions of models and ocean areas.



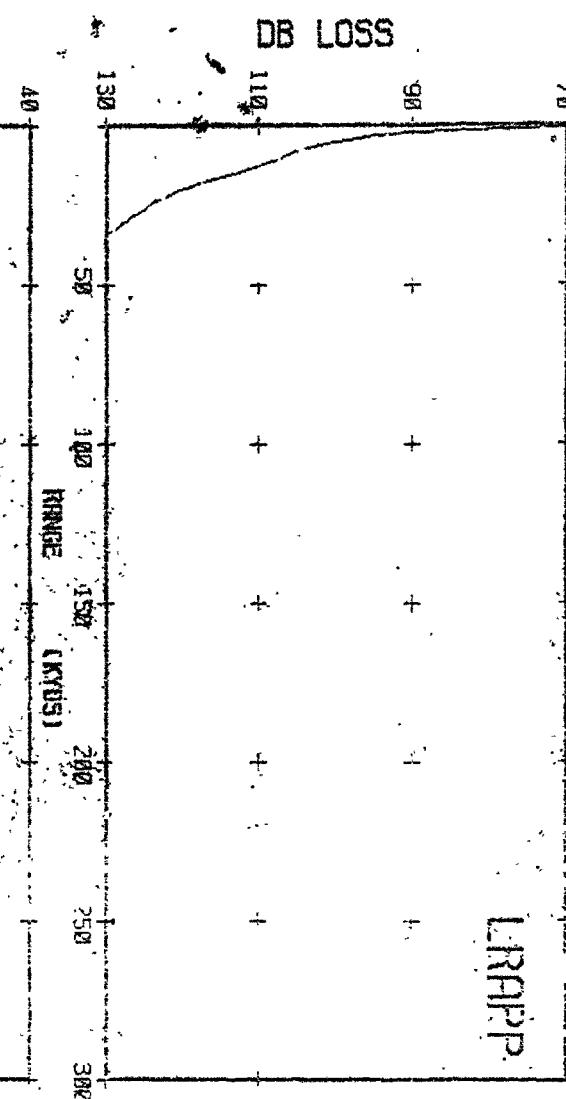
AREA AB SUMMER

8 20 N. 83° F. 10

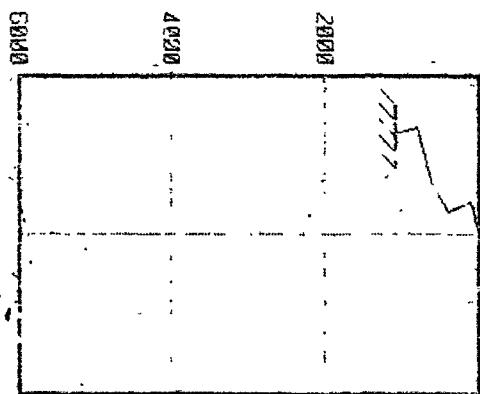
1450 M/S 1500 1550

LRAFP

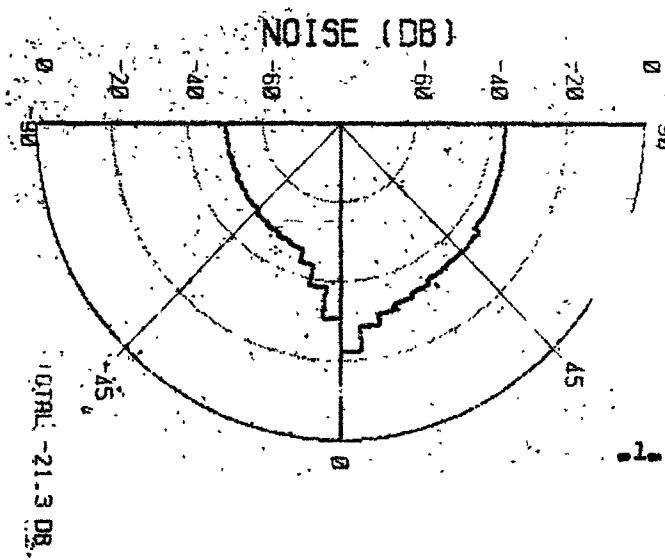
### DB LOSS



### DEPTH IN METERS



### NOISE (DB)



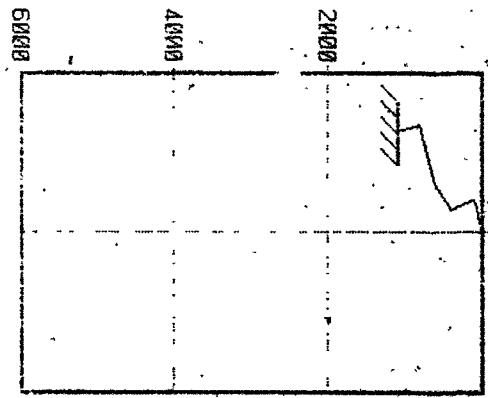
1968 SUMMER

3. 58 R 68 F 10

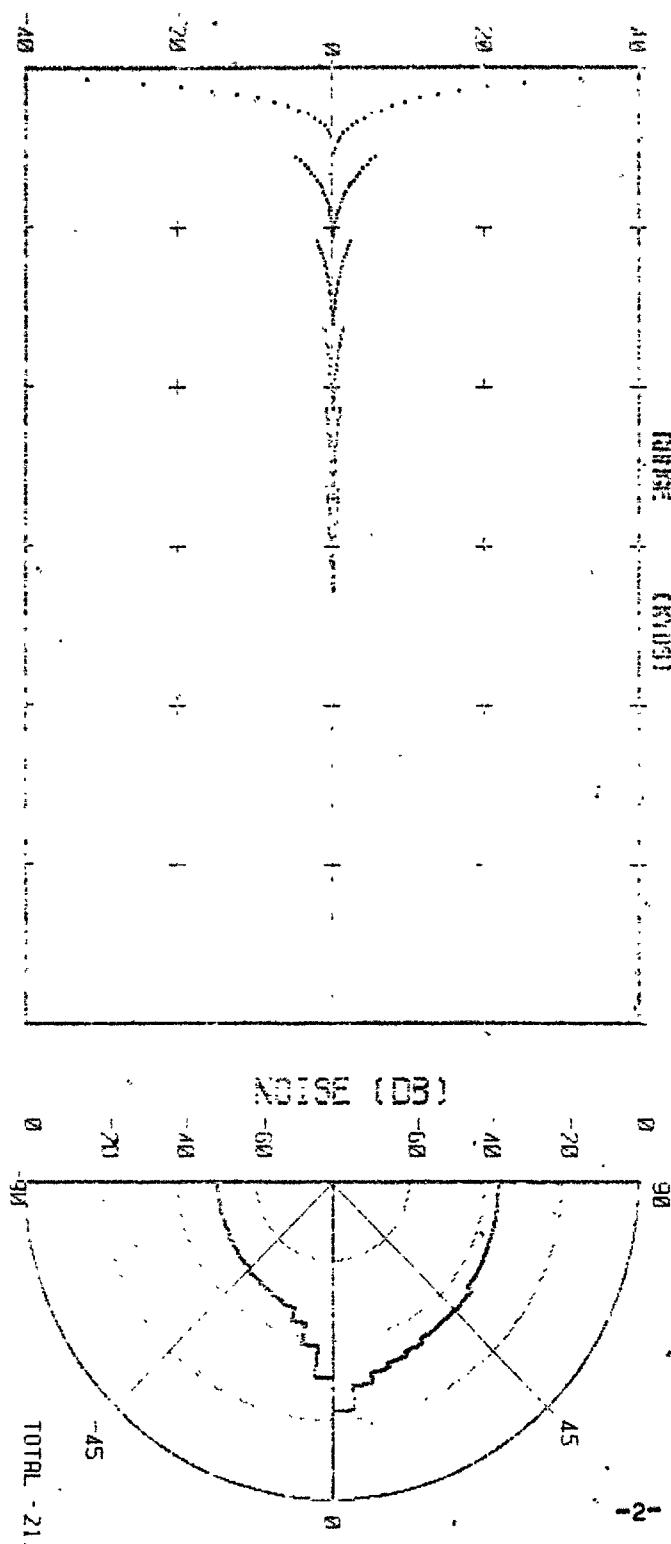
1450 M/S 1500 1550

LROP

DEPTH IN METERS



NOISE (DB)



AER 4B SIMMER

S 286 R 60 F 10

1450 m/s 1500 1550

LR/HPP

DB LOSS

110

100

90

80

70

60

50

40

30

20

10

0

130  
100  
50  
150  
200  
250  
300

RANGE (KNOTS)

ARRIVAL ANGLE

20

10

0

-10

-20

-30

-40

-50

-60

-70

-80

-90

DEPTH IN METERS

20000  
40000

60000  
80000

100000  
120000

140000  
160000

180000  
200000

220000  
240000

260000  
280000

300000  
320000

340000  
360000

NOISE (DB)

-60

-40

-20

0

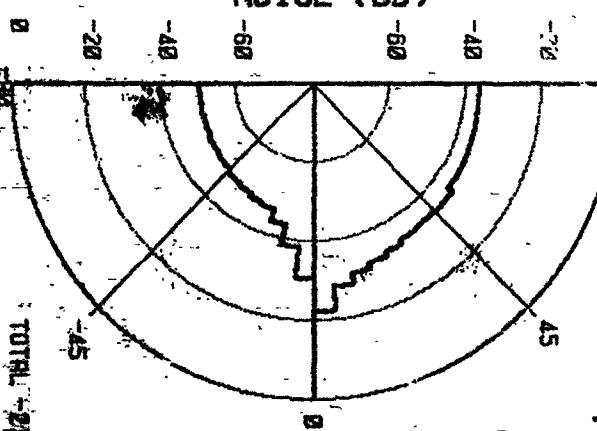
20

40

60

80

100



1450 M/S 1540 1550

0011 AS STEERER

LRRFP

LOSS

110

110

110

110

110

110

110

110

110

110

110

110

110

110

110

110

110

110

110

110

110

110

110

DEPTH IN METERS

6000

4000

2000

0

ARRIVED ANG

NOISE (DB)

-60

-40

-20

0

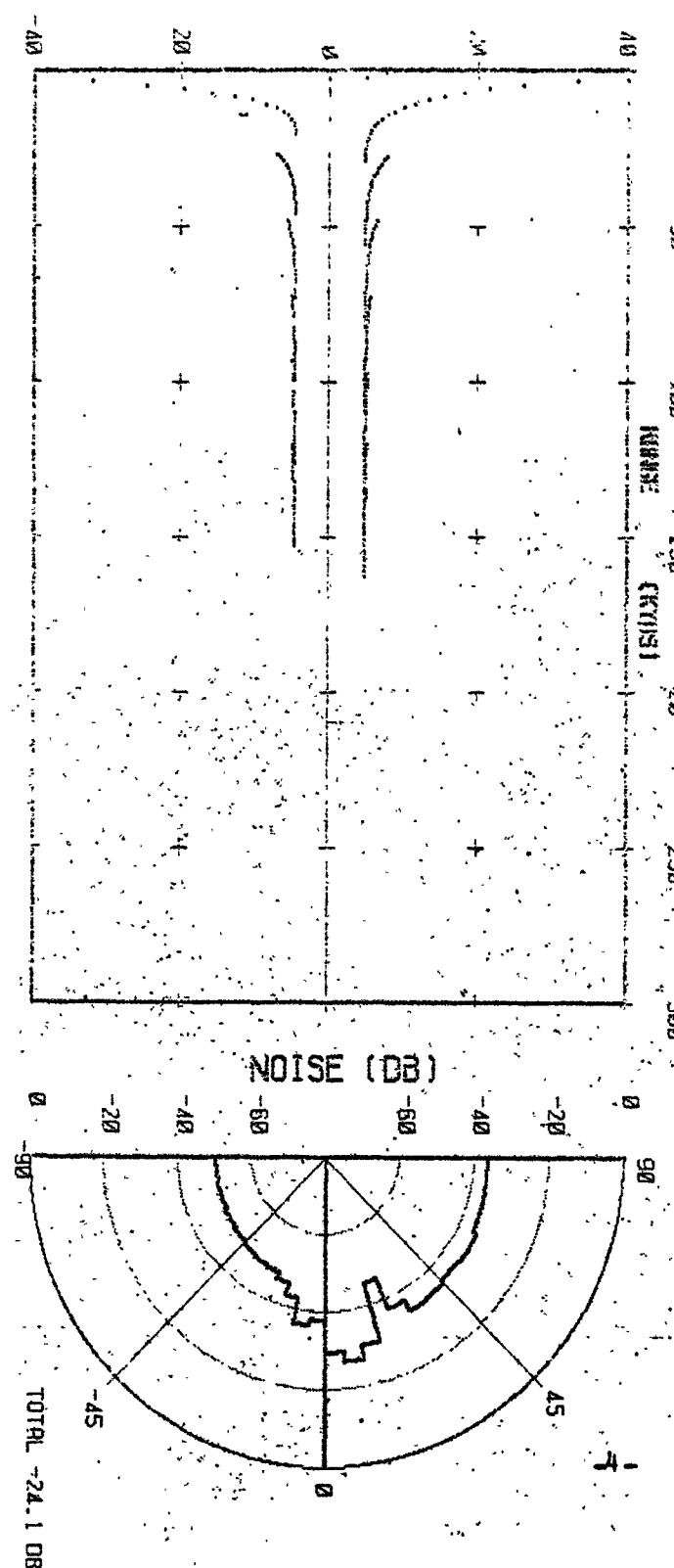
20

40

60

80

100



AFTER 4B SUMMER

S 58 R 108 F 10

1150 M/S 1500 1550

L RAPP

DB LOSS

110

100

90

80

70

60

50

40

30

20

10

0

130

120

110

100

90

80

70

60

50

40

30

20

10

0

2000

5000

4000

DEPTH IN METERS

2000

5000

4000

ARRIVAL ANGLE

W

N

E

S

NE

SE

SW

NW

SW

SE

SW

NOISE (DB)

-60

-40

-20

0

20

40

60

80

100

120

140

160

180

200

220

240

260

280

300

320

340

360

380

400

420

440

460

480

500

520

540

560

580

600

620

640

660

680

700

720

740

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780

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1080

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1120

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1180

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1280

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15°

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105°

120°

135°

150°

165°

180°

195°

210°

225°

240°

255°

270°

285°

300°

315°

330°

345°

360°

375°

390°

405°

420°

435°

450°

465°

480°

495°

510°

525°

540°

555°

570°

585°

600°

615°

630°

645°

660°

675°

690°

705°

720°

735°

750°

765°

780°

795°

810°

825°

840°

855°

870°

885°

900°

915°

930°

945°

960°

975°

990°

1005°

1020°

1035°

1050°

1065°

1080°

1095°

1110°

1125°

1140°

1155°

1170°

1185°

1200°

1215°

1230°

1245°

1260°

1275°

1290°

1305°

1320°

1335°

1350°

1365°

1380°

1395°

1410°

1425°

1440°

1455°

1470°

1490°

1505°

1520°

1535°

1550°

1565°

1580°

1595°

1610°

1625°

1640°

1655°

1670°

1685°

1700°

1715°

1730°

1745°

1760°

1775°

1790°

1805°

1820°

1835°

1850°

1865°

1880°

1895°

1910°

1925°

1940°

1955°

1970°

1985°

2000°

2015°

2030°

2045°

2060°

2075°

2090°

2105°

2120°

2135°

2150°

2165°

2180°

2195°

2210°

2225°

2240°

2255°

2270°

2285°

2300°

2315°

2330°

2345°

2360°

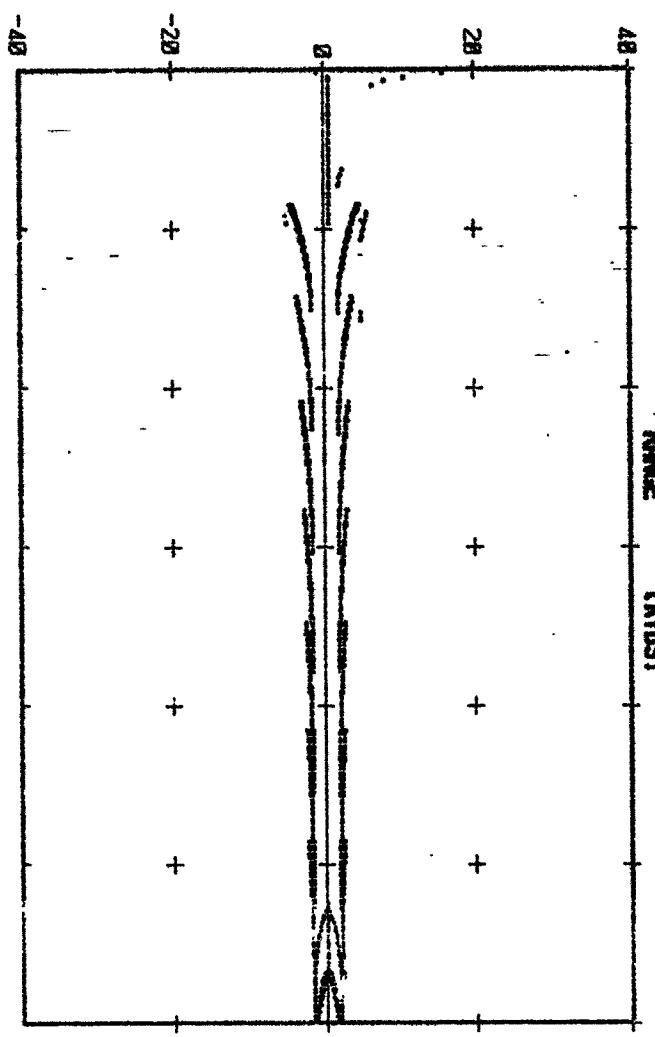
2375°

2390°

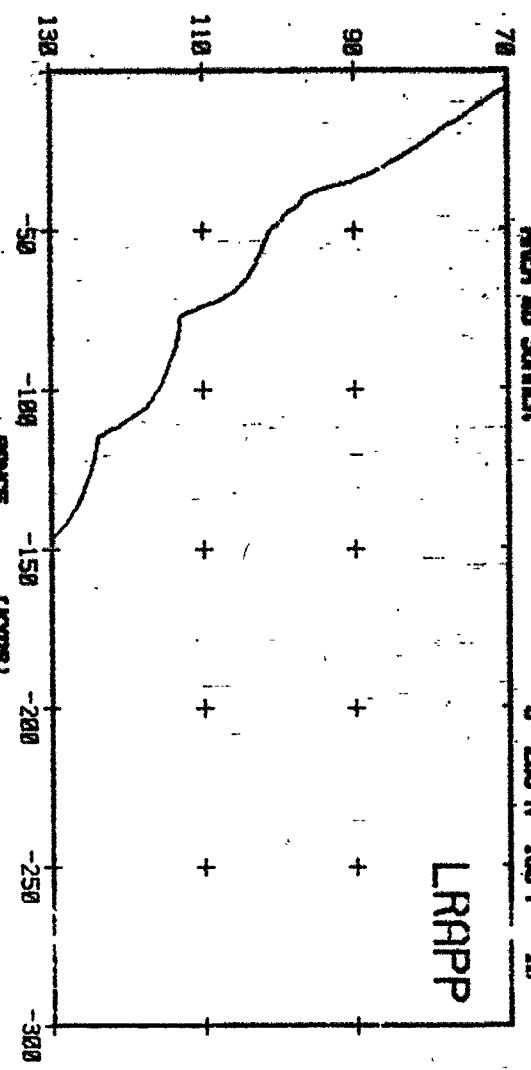
2405°

2420°

### ARRIVAL ANGLE

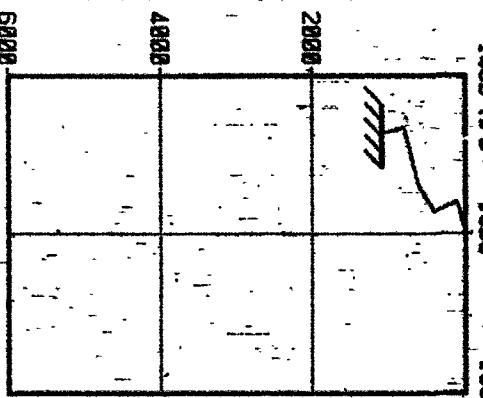


### DB LOSS



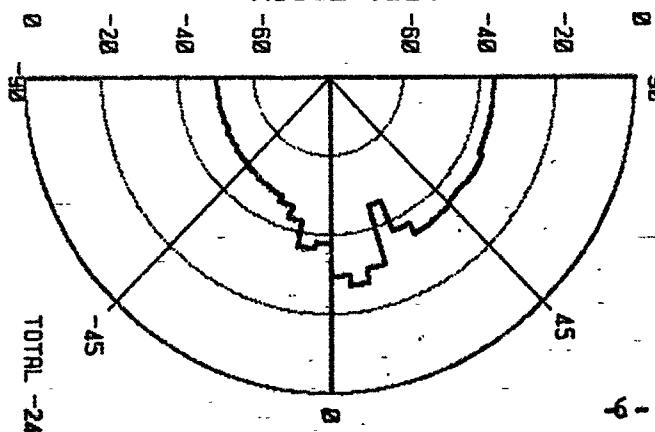
LRAPP

### DEPTH IN METERS



1458 MS 1520 1550

### NOISE (DB)



TOTAL -24.1 DB

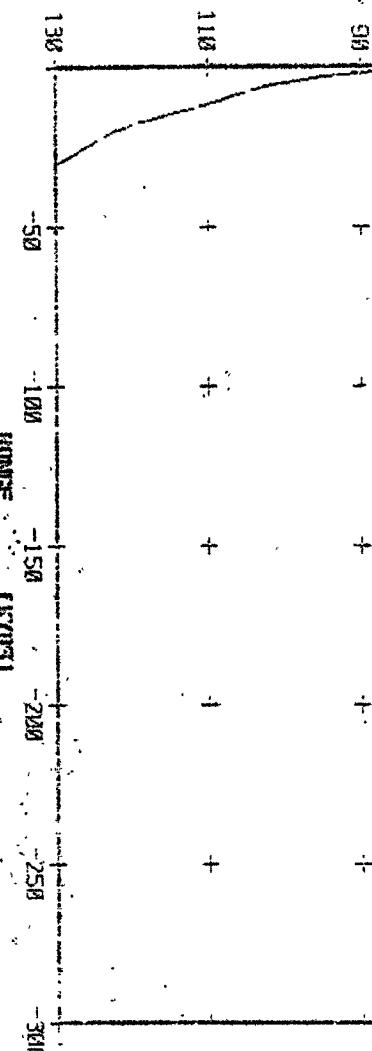
6-

70  
60  
50  
40  
30  
20 R 300 F 10

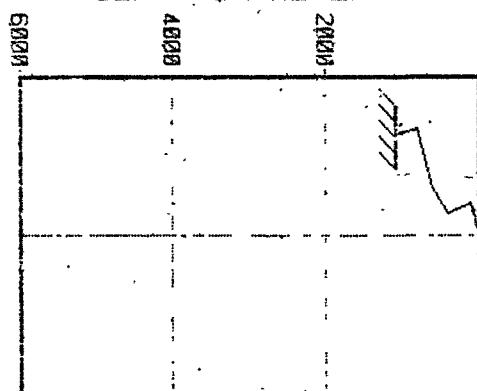
1450 M/S 1500 1550

### LRAFP

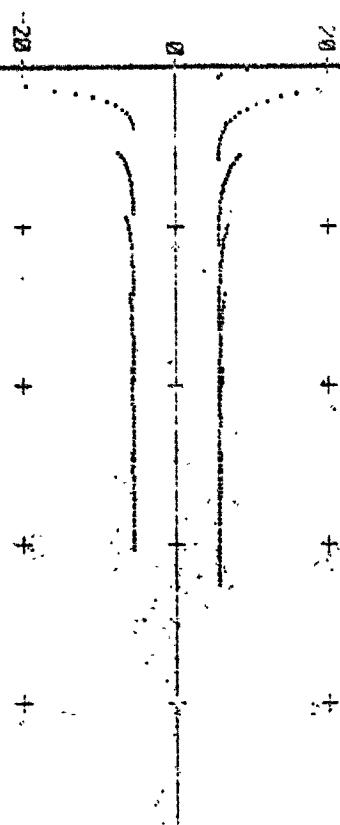
DB LOSS



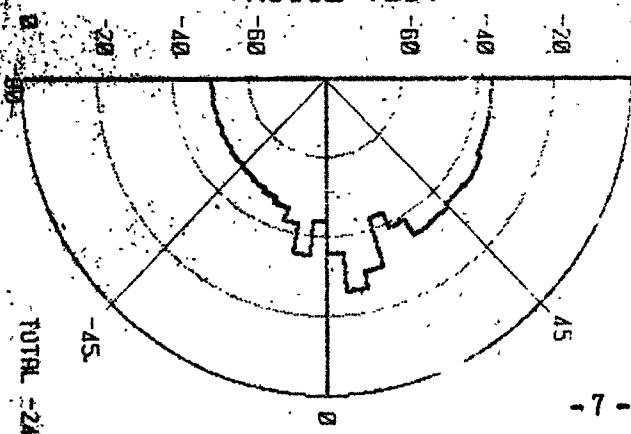
DEPTH IN METERS



ARRIVAL ANGLE



NOISE (DB)



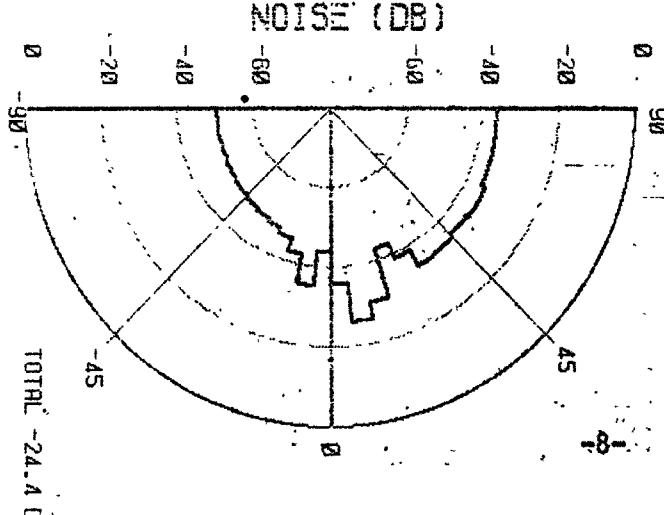
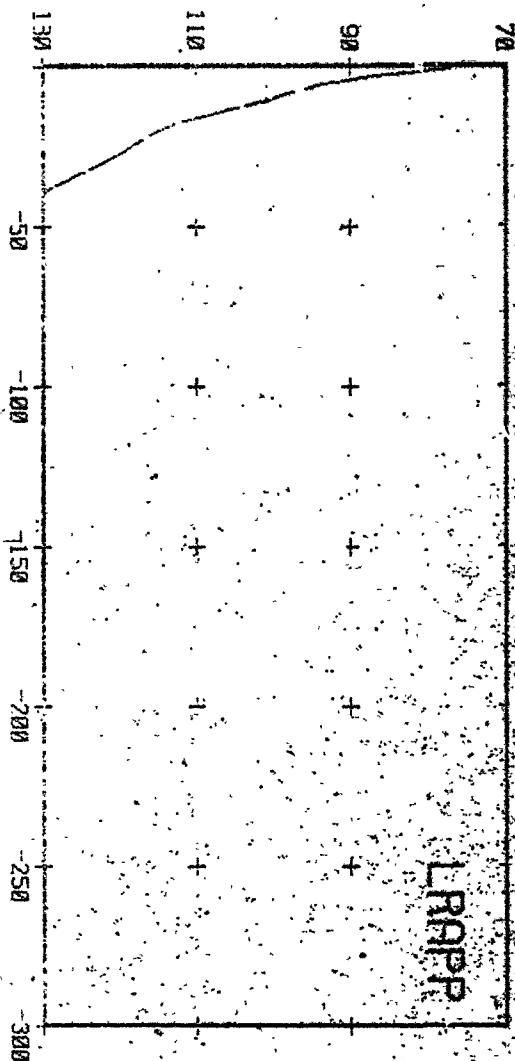
TOTAL -24.4 DB



PAPERS OF HENRY

3. 50 BY 50

卷之三



78

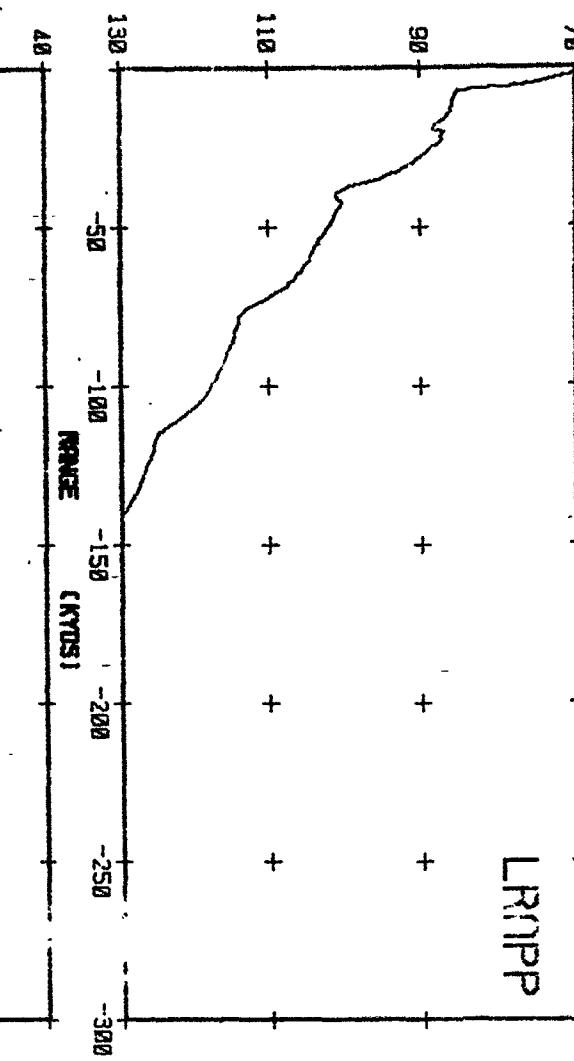
FREQUENCIES

S 265 R 300 F 10

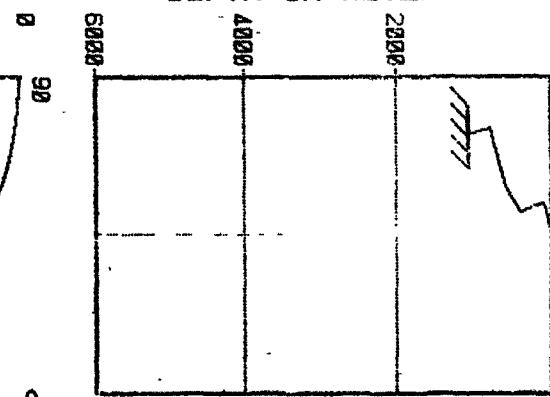
1450 M/S 1500 1550

LRNIPP

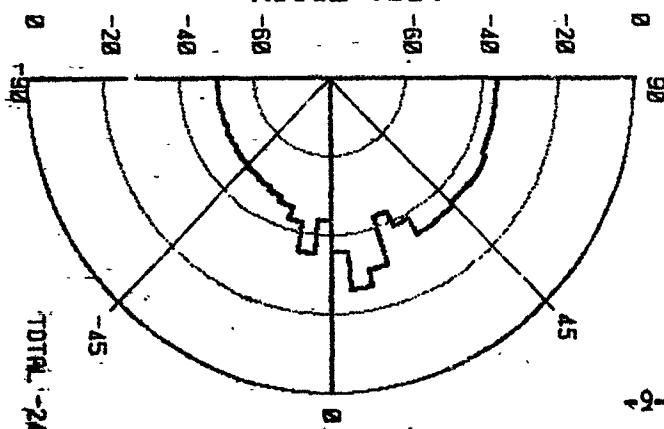
## DB LOSS



## DEPTH IN METERS



## NOISE (DB)



TOTAL = -24.4 dB

PERIOD SUMMER

8 24 R 1000 F 10'

1450 M/S 1500 1550

L.R.F.P.P.

LOSS

dB

0

50

100

150

200

250

300

350

400

450

500

300

400

500

600

700

800

300

400

500

600

700

800

DEPTH IN METERS

0

2000

4000

6000

NOISE (DB)

0

-20

-40

-60

-80

-100

-120

-140

-160

-180

-200

-220

-240

-260

-280

-300

-320

-340

-360

-380

-400

-420

-440

-460

-480

-500

-520

-540

-560

-580

-600

-620

-640

-660

-680

-700

-720

-740

-760

-780

-800

-820

-840

-860

-880

-900

-920

-940

-960

-980

-1000

-1020

-1040

-1060

-1080

-1100

-1120

-1140

-1160

-1180

-1200

-1220

-1240

-1260

-1280

-1300

-1320

-1340

-1360

-1380

-1400

-1420

-1440

-1460

-1480

-1500

-1520

-1540

-1560

-1580

-1600

-1620

-1640

-1660

-1680

-1700

-1720

-1740

-1760

-1780

-1800

-1820

-1840

-1860

-1880

-1900

-1920

-1940

-1960

-1980

-2000

-2020

-2040

-2060

-2080

-2100

-2120

-2140

-2160

-2180

-2200

-2220

-2240

-2260

-2280

-2300

-2320

-2340

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-3160

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-4720

-4740

-4760

-4780

-4800

-4820

-4840

-4860

-4880

-4900

-4920

-4940

-4960

-4980

-5000

-5020

-5040

-5060

-5080

-5100

-5120

-5140

-5160

-5180

70

AFTER 48 SUMMER

1450 ft

50 ft

1500 ft

1550

L RAPP

DB LOSS

90

+

+

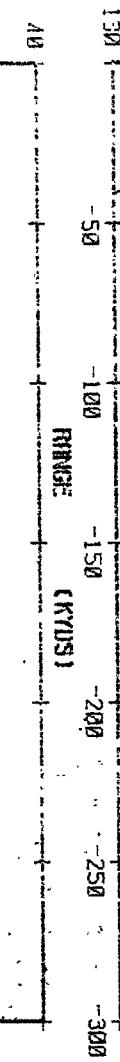
+

+

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+

+



DEPTH IN METERS

2000

4000

6000

8000

10000

12000

14000

16000

18000

20000

22000

24000

26000

28000

30000

NOISE (DB)

-20

-40

-60

-80

-100

-120

-140

-160

-180

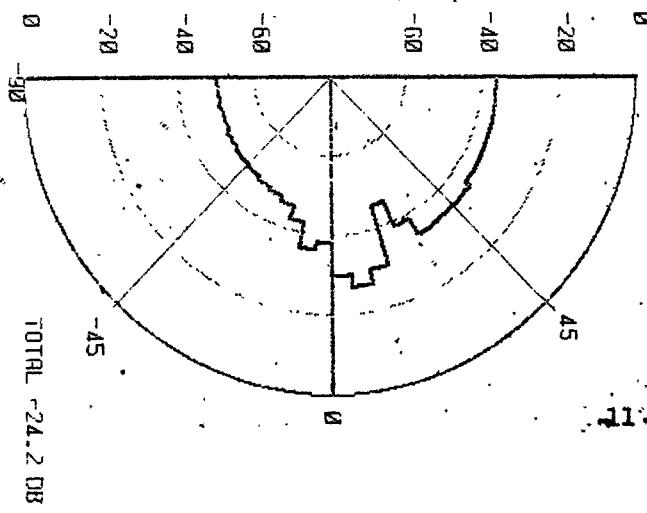
-200

-220

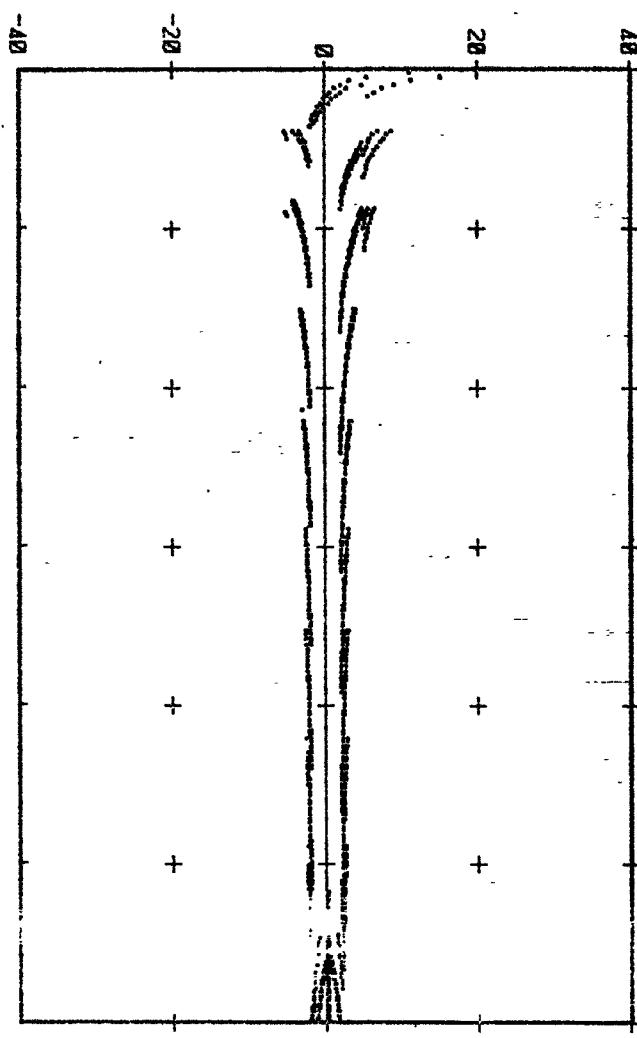
-240

-260

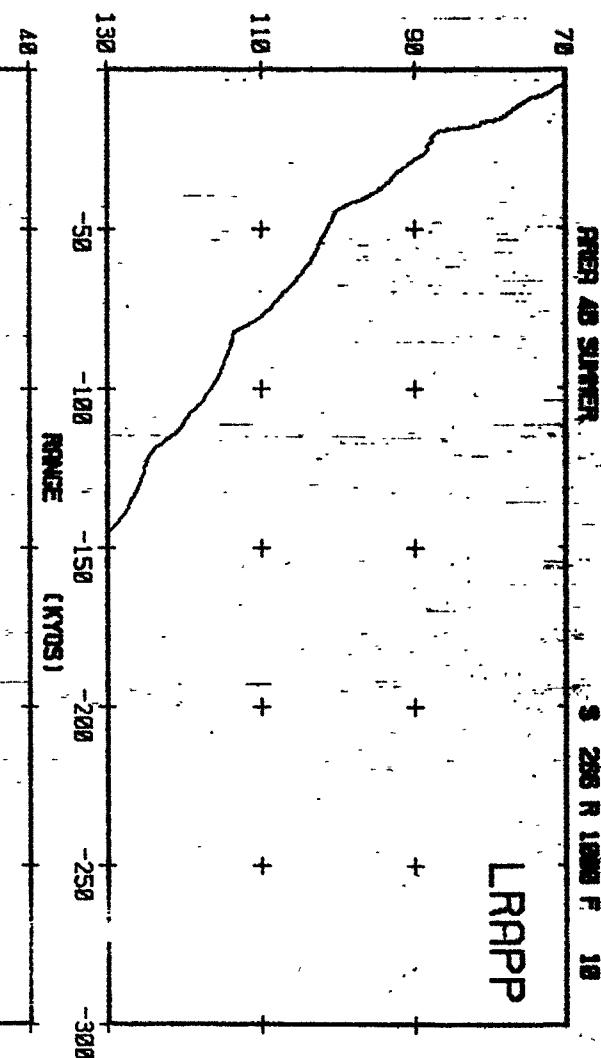
-280



### ARRIVAL ANGLE



### DB LOSS



L RAPP

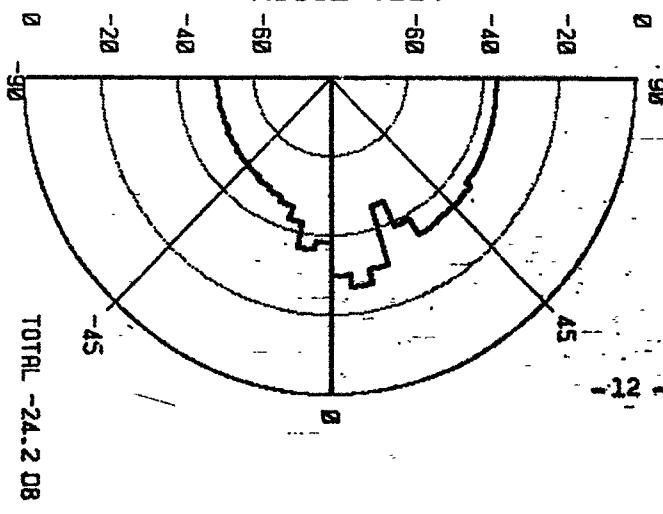
FREE AS SINKER

3 288 R 1000 F 10

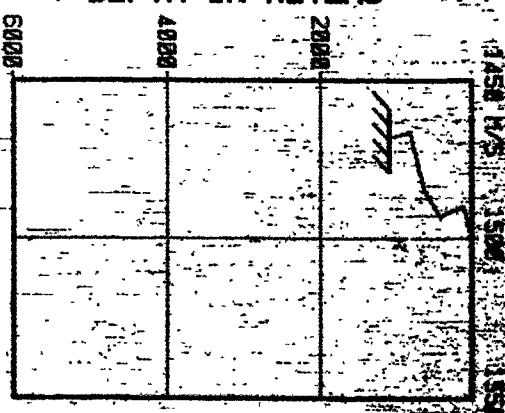
class 65

150

### NOISE (DB)



### DEPTH IN METERS



76

FIRE AB SUNKEN

S 20 R 1312 F 10

1450 M/S 1500 1550

LRRPP

LOSS

dB

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

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+

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+

DEPTH IN METERS

2000

4000

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8000

10000

12000

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16000

18000

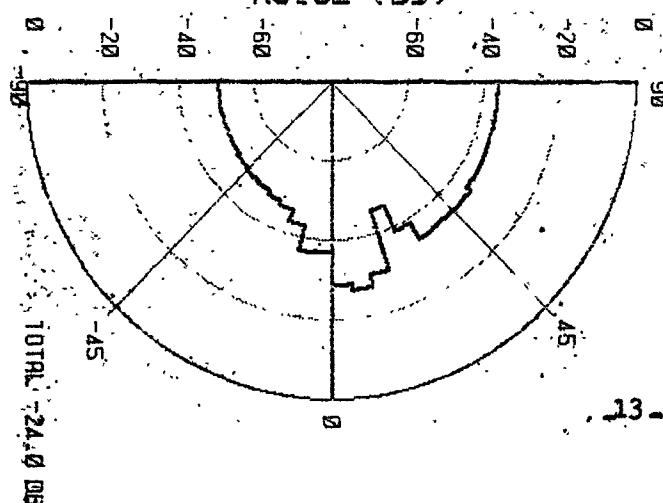
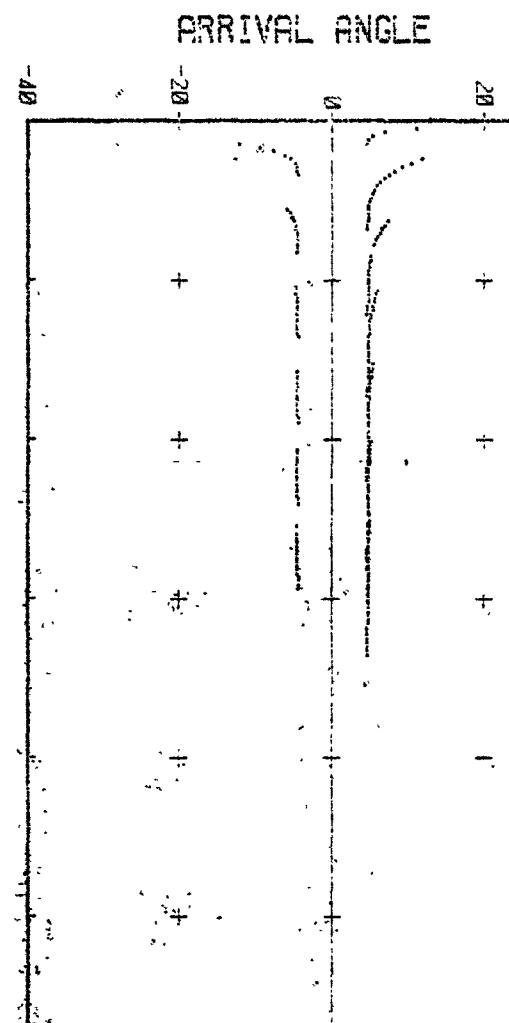
20000

130  
100  
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-300

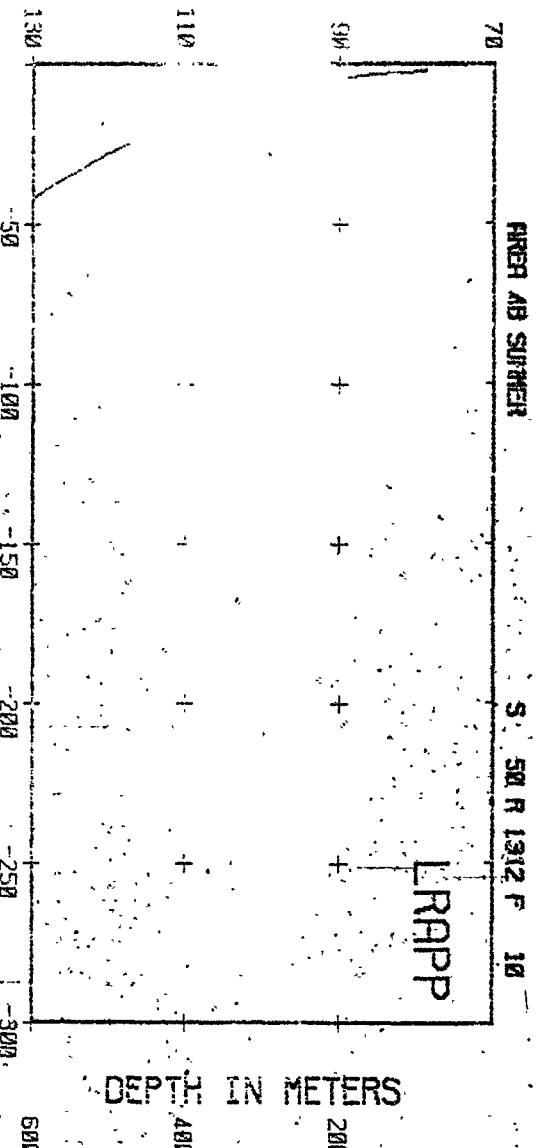
RANGE (KMS)

0  
-20  
-40  
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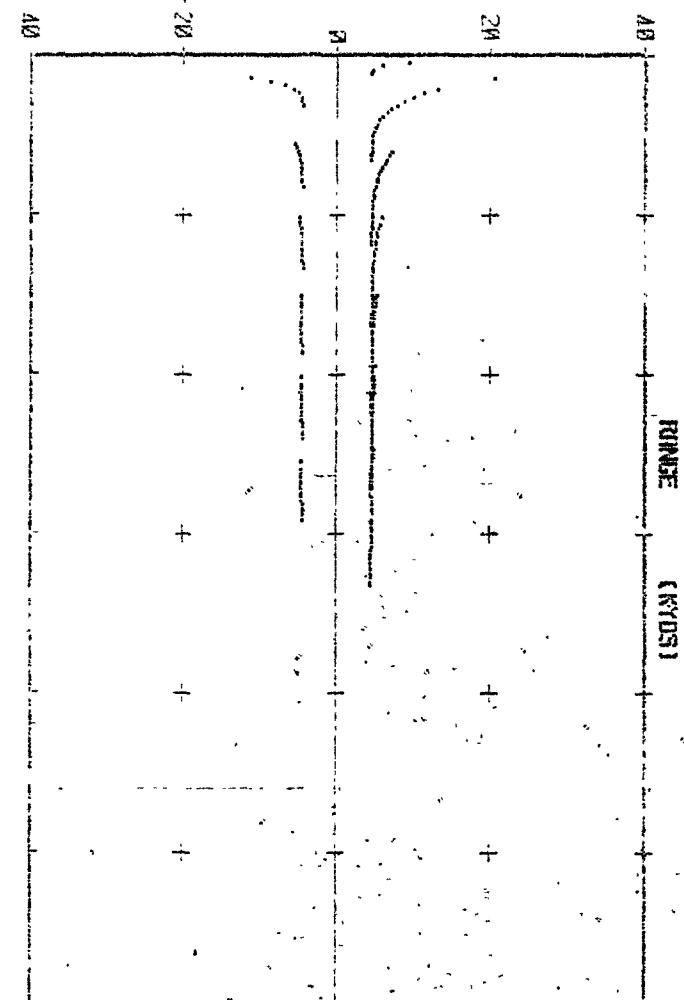
NOISE (DB)



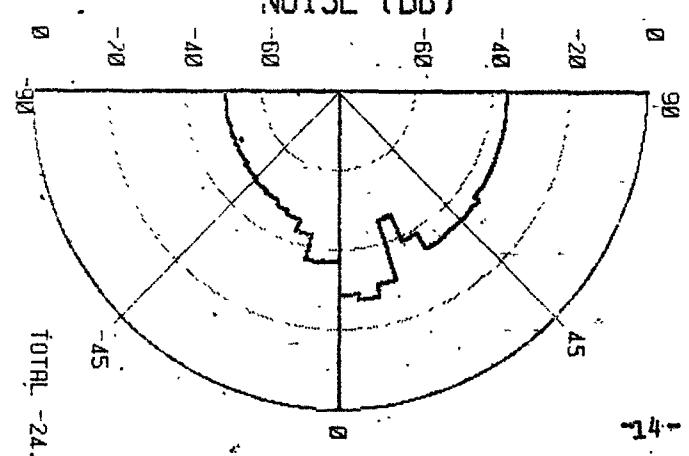
DB LOSS



ARRIVAL ANGLE



NOISE (DB)



TOTAL -24.0 DB

70

AREA 4B SUMMER

S 266 R 1312 F 10

1450 M/S 1500 1550

LRripp

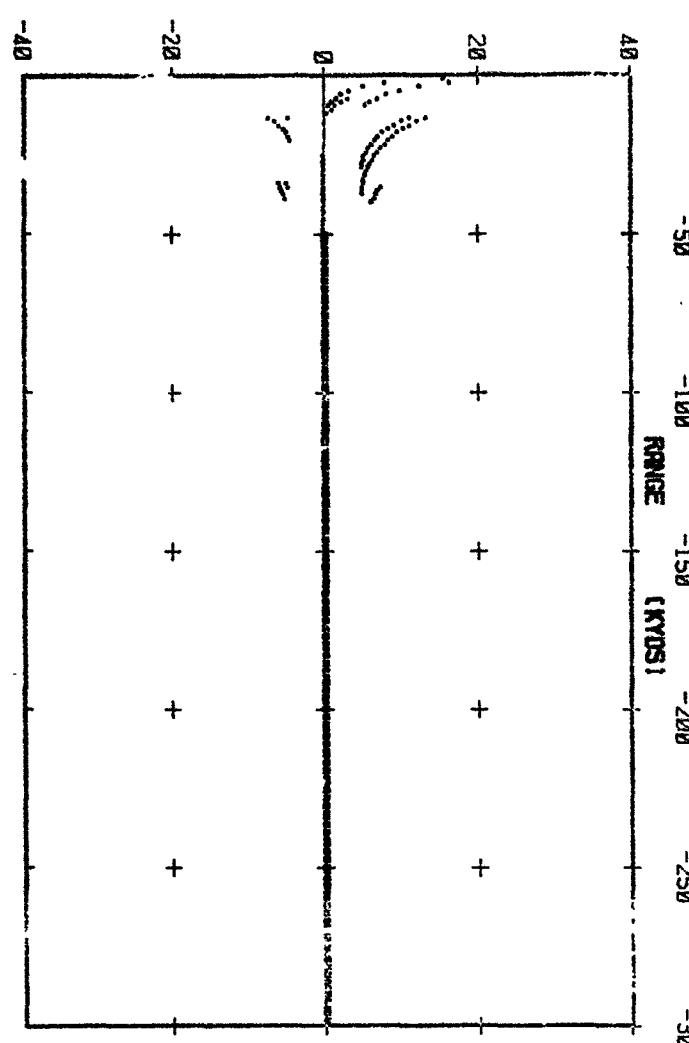
DB LOSS

+ + + + + +

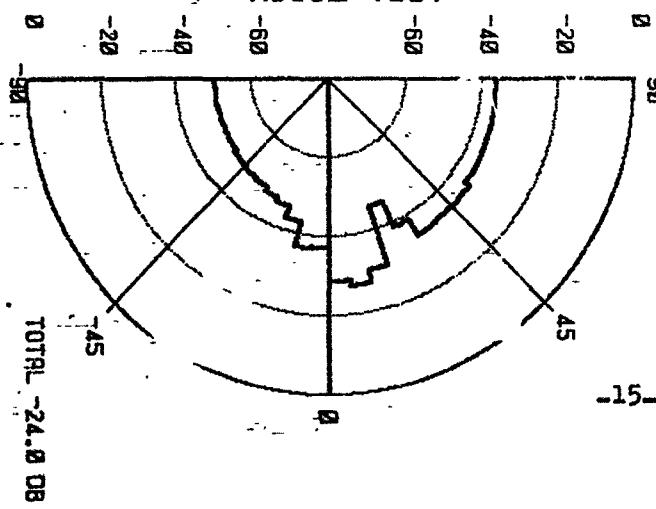
DEPTH IN METERS

5000M 4000M

ARRIVAL ANGLE



NOISE (DB)



65634 48 SURVEY

3 2d R 1500 F 10

1450 m/s 1500 15.

LRCPP

LOSS

dB

110

100

90

80

70

60

50

40

30

20

10

0

DEPTH IN METERS

8000

6000

4000

2000

0

8000

6000

4000

2000

0

ARRIVAL ANGLE

-20

0

+20

+40

+60

+80

+100

+120

+140

+160

+180

+200

+220

+240

+260

+280

+300

+320

+340

+360

+380

+400

+420

+440

+460

+480

+500

+520

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+820

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+880

+900

+920

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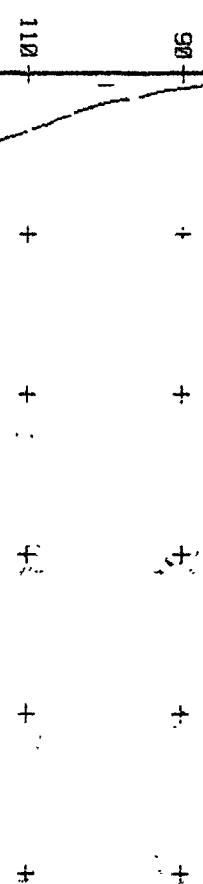
AREA AB SUMMER

S. N. 50 R 15W F. 10

1458 M/S 1500 1550

LRAAPP

DB LOSS



130

110

90

40

0

-50

-100

-150

-200

-250

+300

4000

2000

0

-2000

-4000

-6000

-8000

-10000

-12000

-14000

-16000

-18000

-20000

-22000

-24000

-26000

-28000

-30000

-32000

-34000

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-40000

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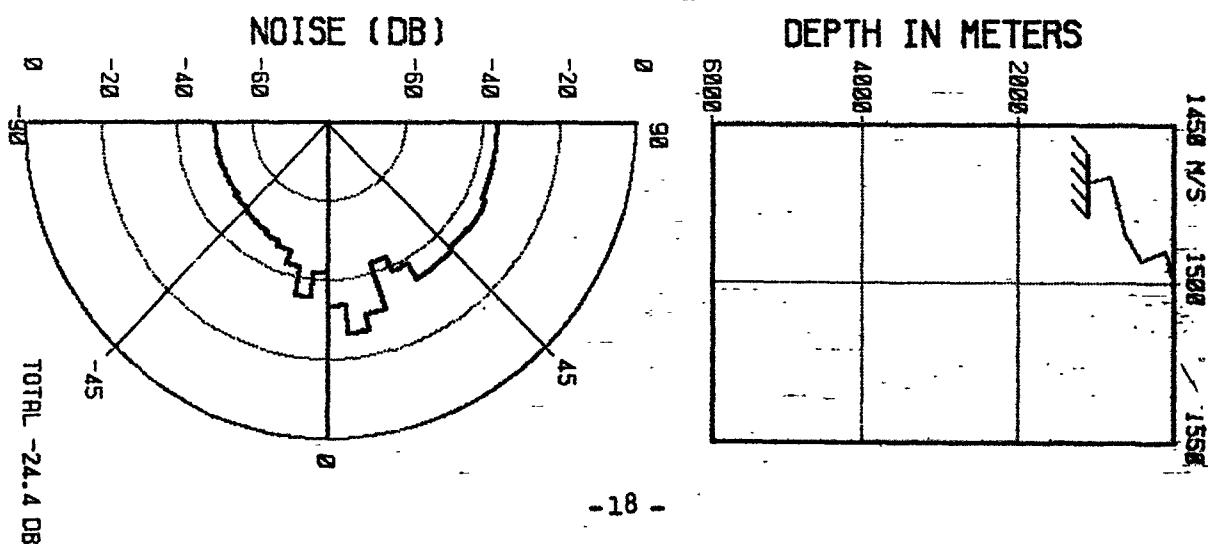
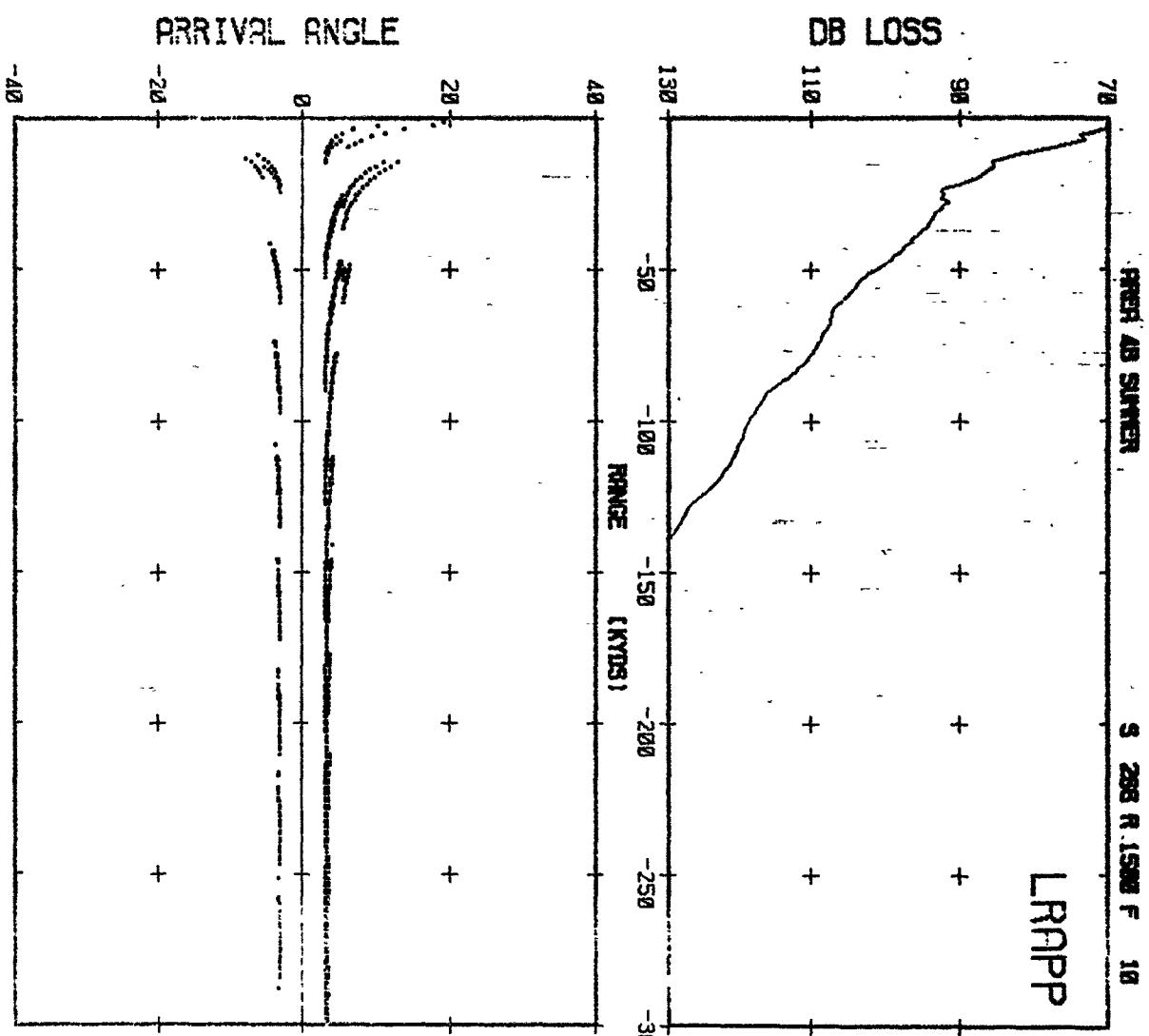
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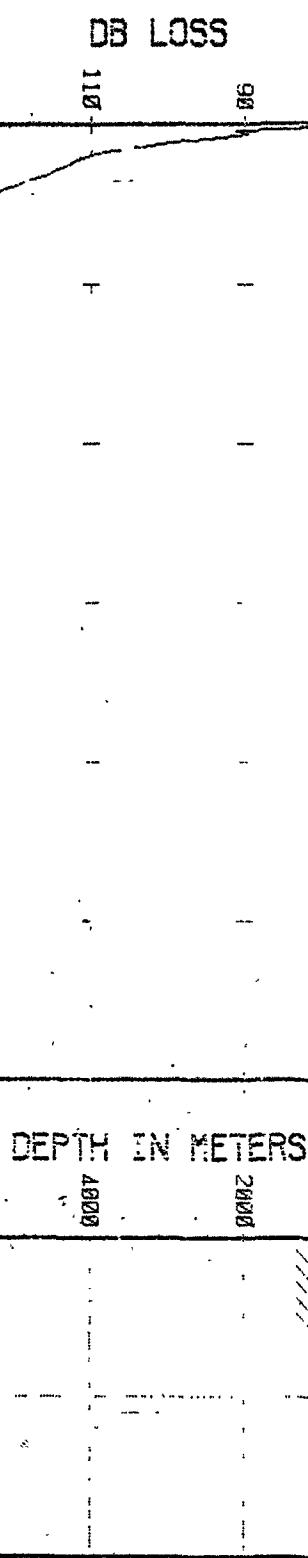
3 208 R.150 F 16

1450 N/S 1500 ✓ 1550

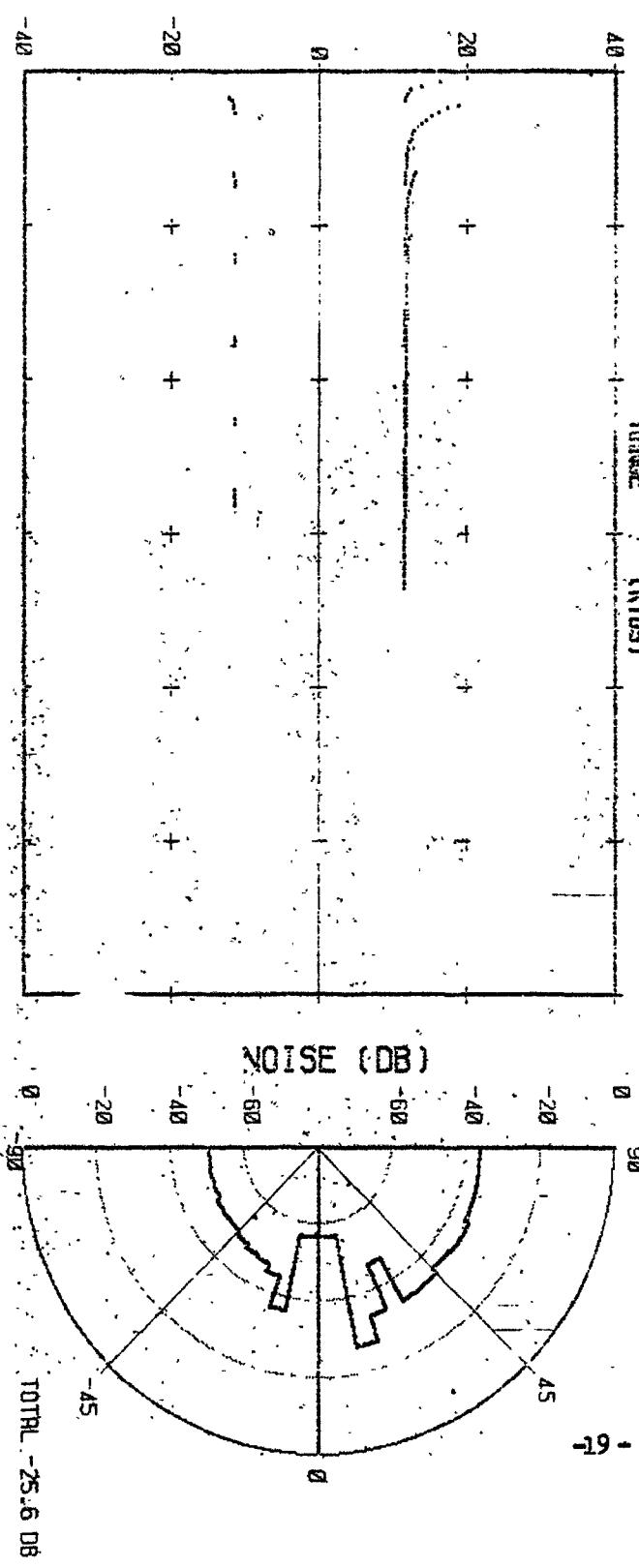


FAR 60 SHOT S 244 2605 F 1E 1450 M/S 1500 1550

LRCIPP



ARRIVAL ANGLE



-40

0

70

ARR. AB SUMMER

S 50 R 2625 F 30

1450 N/S 1500 1550

L RAPP

DB LOSS

90

110

130

150

170

190

210

230

250

270

290

310

330

350

370

390

410

430

450

470

490

510

530

550

570

590

610

630

650

670

690

710

730

750

770

790

810

830

850

870

890

910

930

950

970

990

1010

1030

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1070

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1830

1850

1870

1890

1910

1930

1950

1970

1990

2010

2030

2050

2070

2090

2110

2130

2150

2170

2190

2210

2230

2250

2270

2290

2310

2330

2350

2370

2390

2410

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2930

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2970

2990

3010

3030

3050

3070

3090

3110

3130

3150

3170

3190

3210

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3990

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4970

4990

5010

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REC 48 SUMMER

S 208 R 2625 F 18

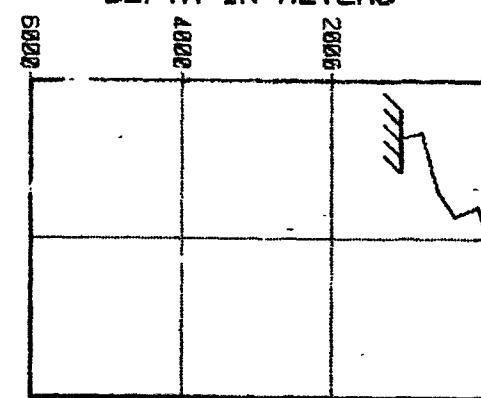
1450 K/S 1500 1550

LRFIPP

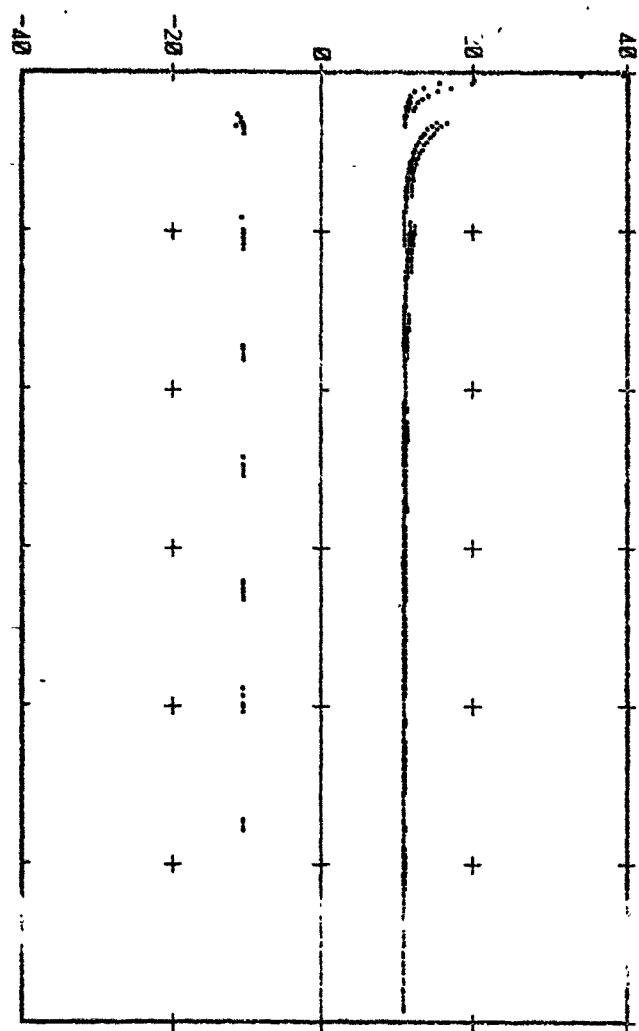
### DB LOSS



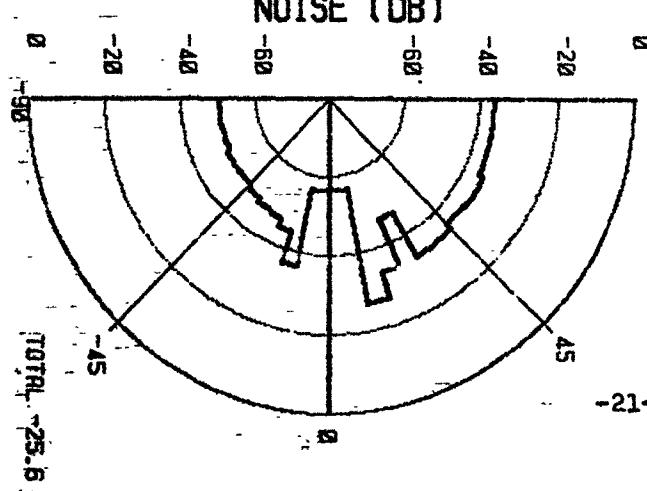
### DEPTH IN METERS



### ARRIVAL ANGLE



### NOISE (DB)



TOTAL -25.6 dB

-21-

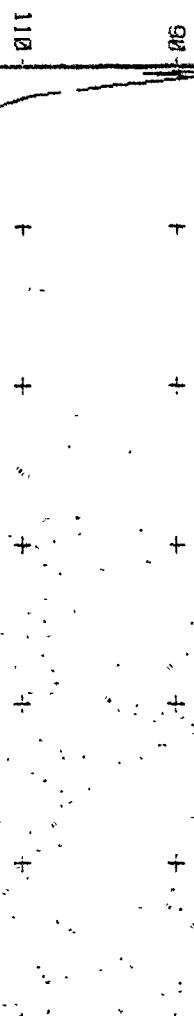
AREA AB SHIMMER

S 20 R 3500 F 10

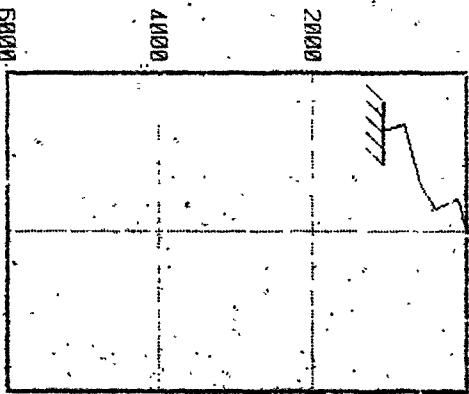
1450 M/S 1500 1550

LRAPP

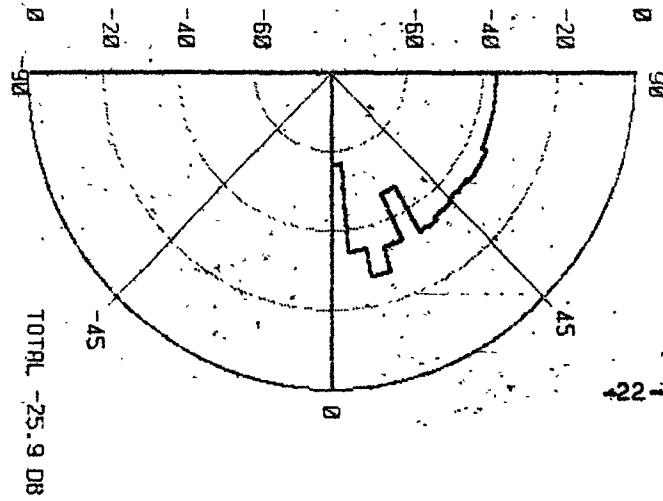
dB LOSS



DEPTH IN METERS

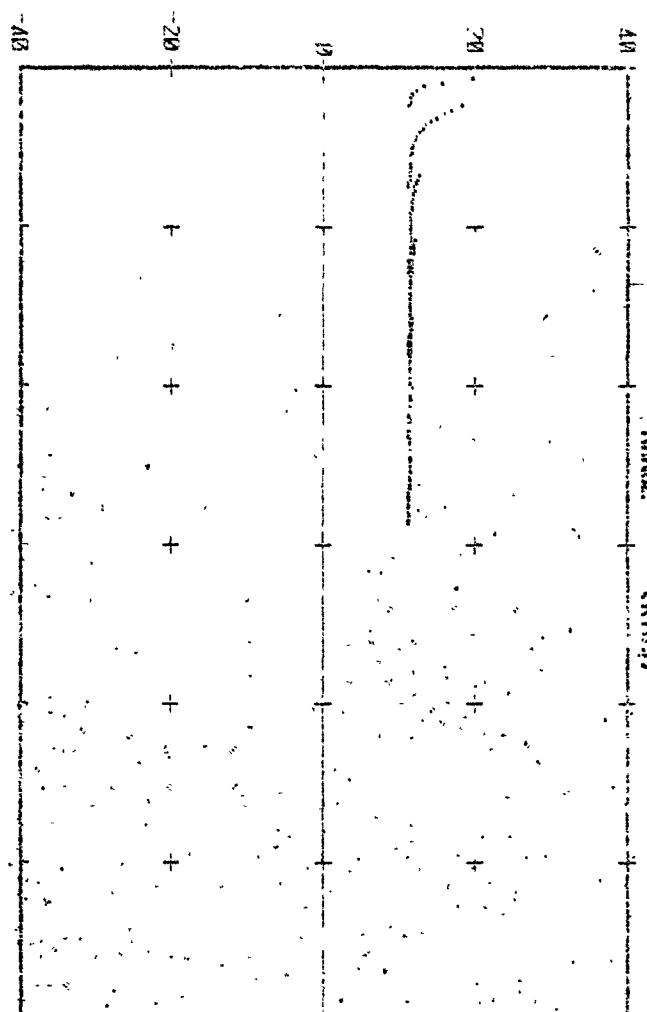


NOISE (DB)



TOTAL -25.9 DB

ARRIVAL ANGLE



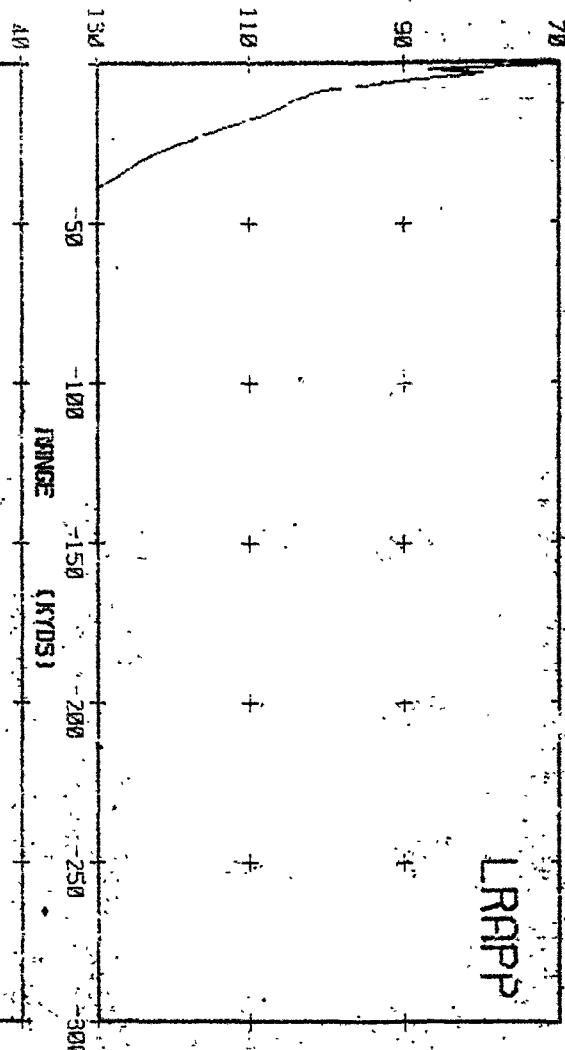
-45

FREQ 48 SUMMER

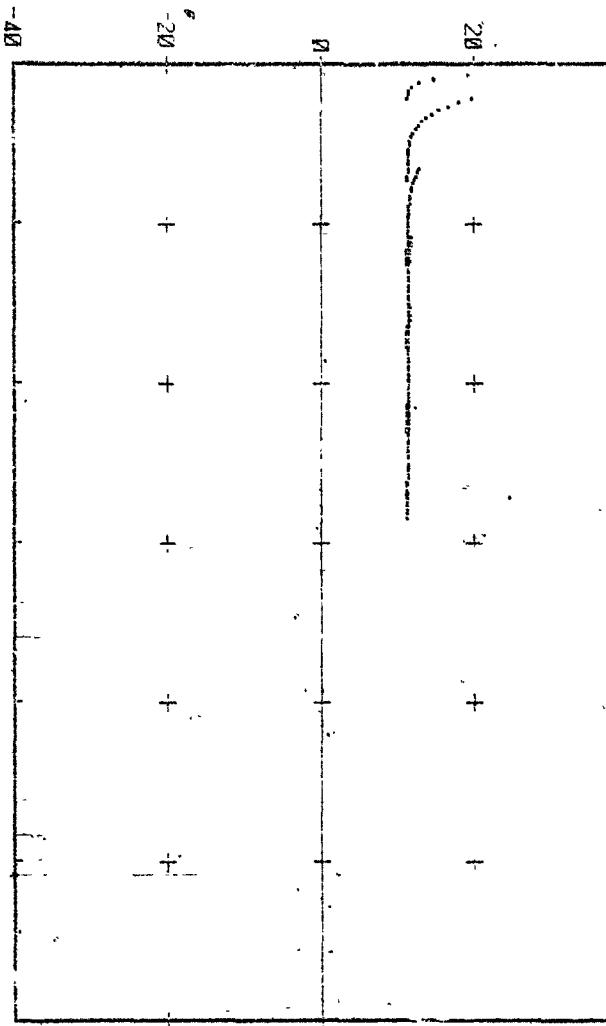
1450 N/S 1500 E/W 1550

LRAPP

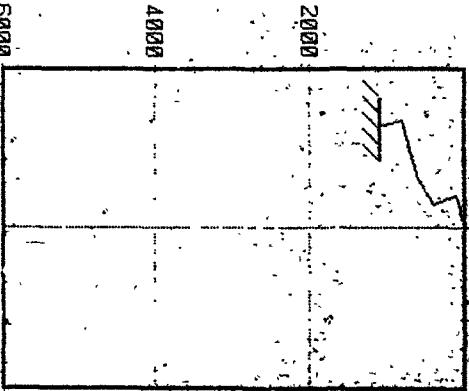
DB LOSS



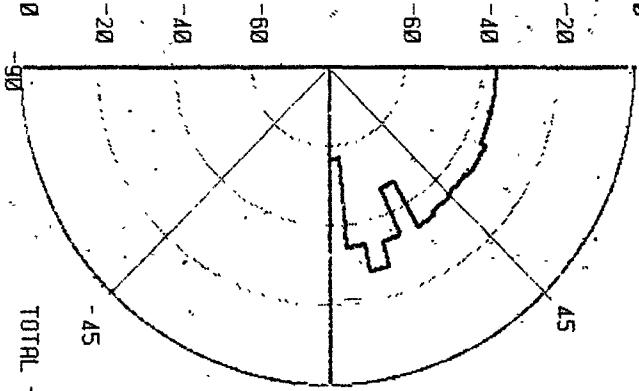
ARRIVAL ANGLE



DEPTH IN METERS



NOISE (DB)



123-

TOTAL -25.9 DB

78

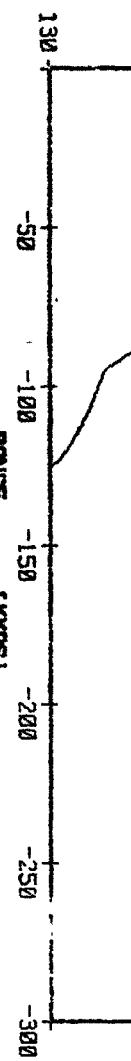
AREA 43 SUMMER

S 288 R 3589 F 10

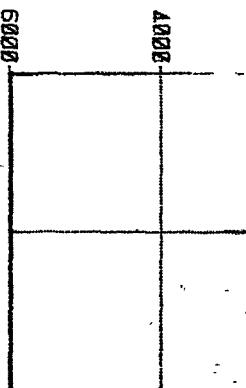
1450 M/S 1500 1550

LRAPP

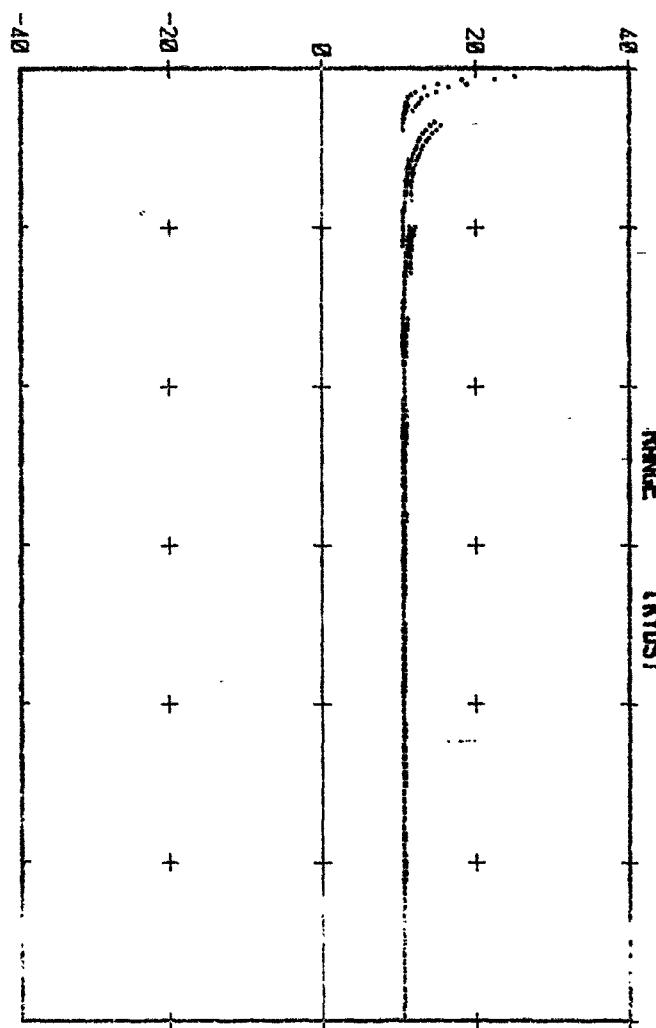
## DB LOSS



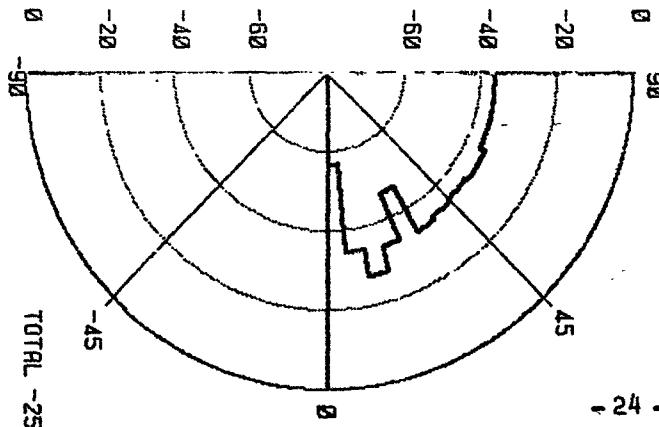
## DEPTH IN METERS



## ARRIVAL ANGLE



## NOISE (DB)



TOTAL -25.9 DB

70

HRR AB SUMMER

S 20 R 60 F 50

1450 M/S 1500 1550

LRAPP

DB LOSS

90

+

+

2000

-

130 100 150 200 250 300

RANGE (KROS)

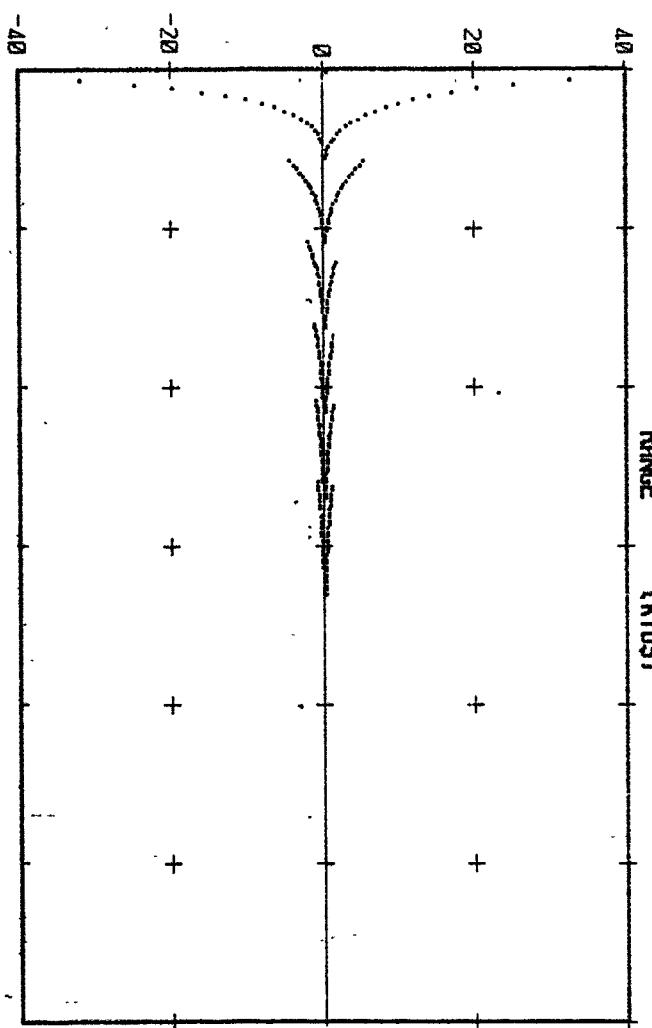
0

DEPTH IN METERS

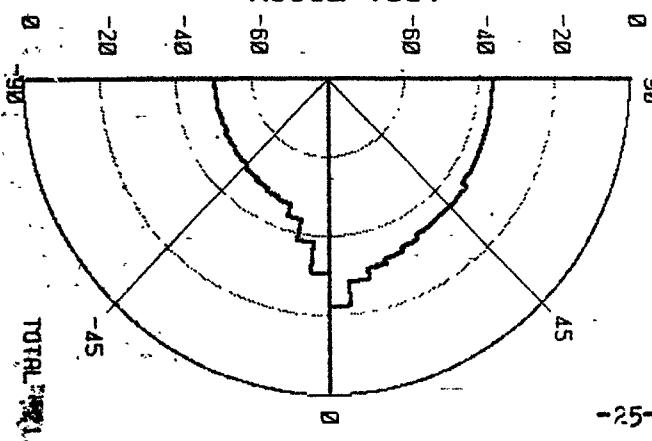
4000

-

ARRIVAL ANGLE

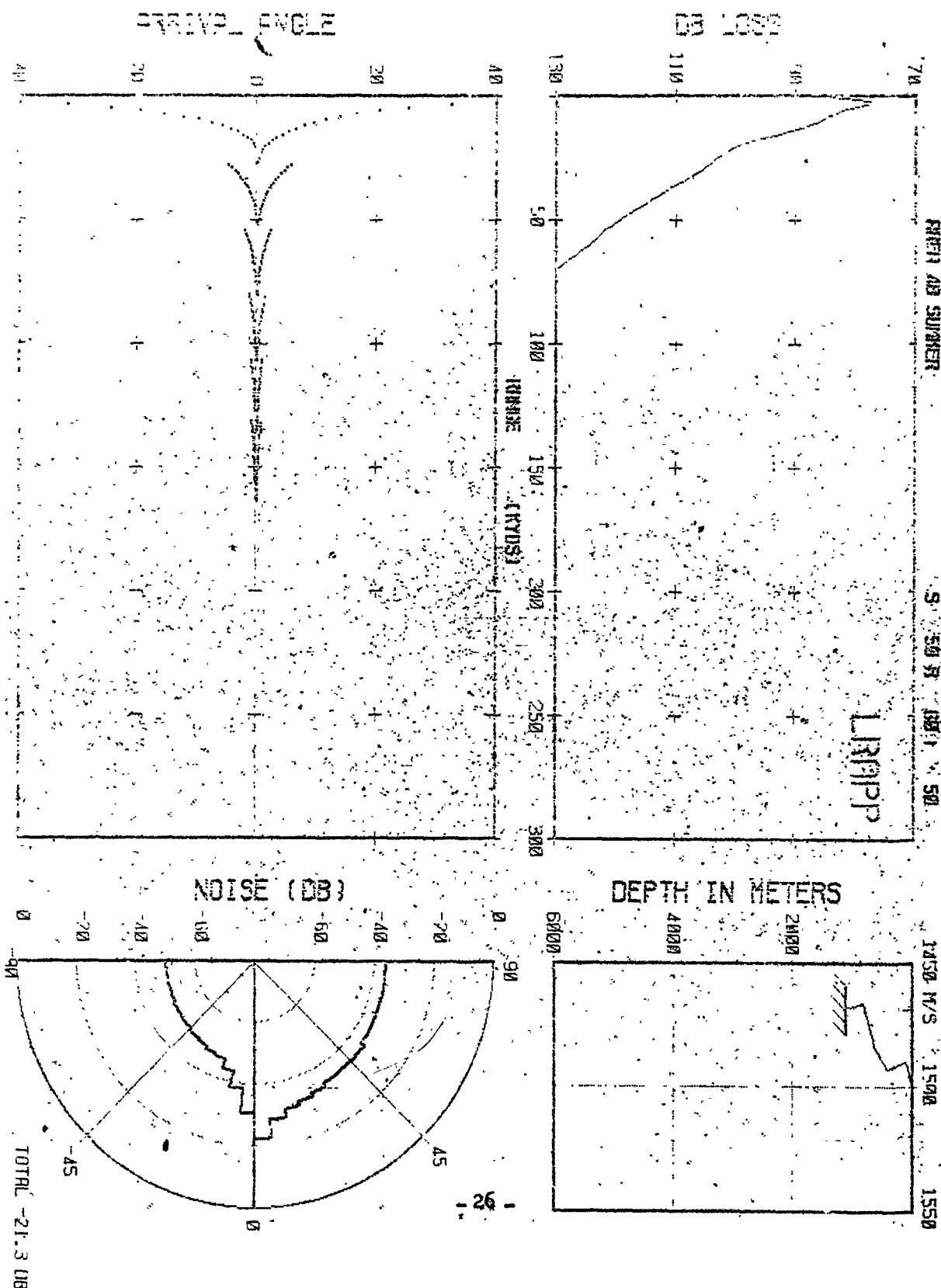


NOISE (DB)



TOTAL -1.3 DB

-25-



卷之三

AREA 4B SUMMER

265 ft

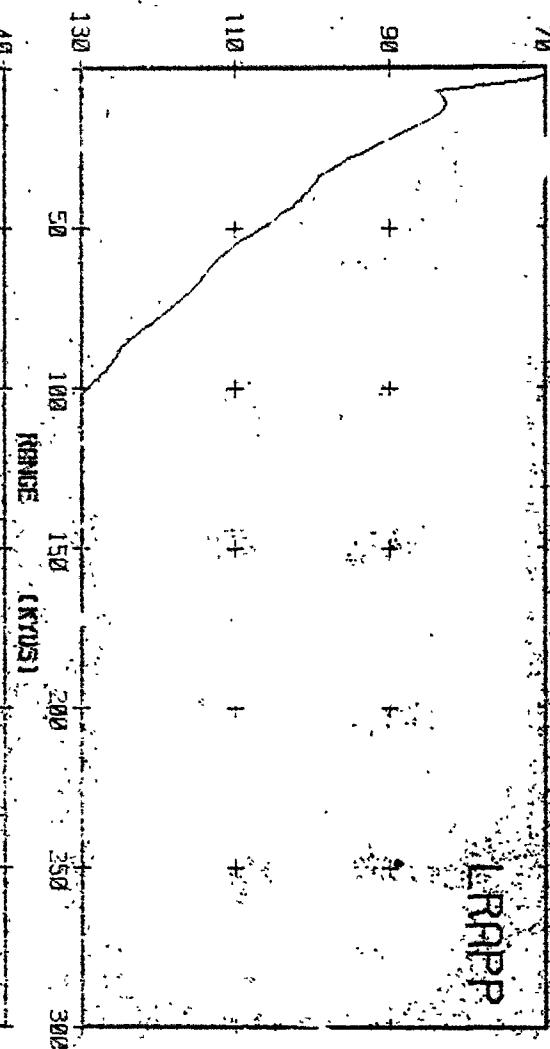
50

3450 ft/s  
1500 ft/s  
1550 ft/s

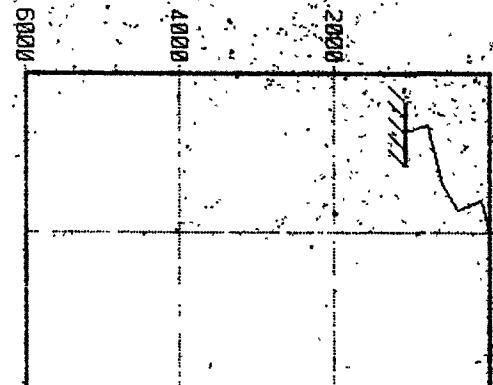
1550

LRAPP

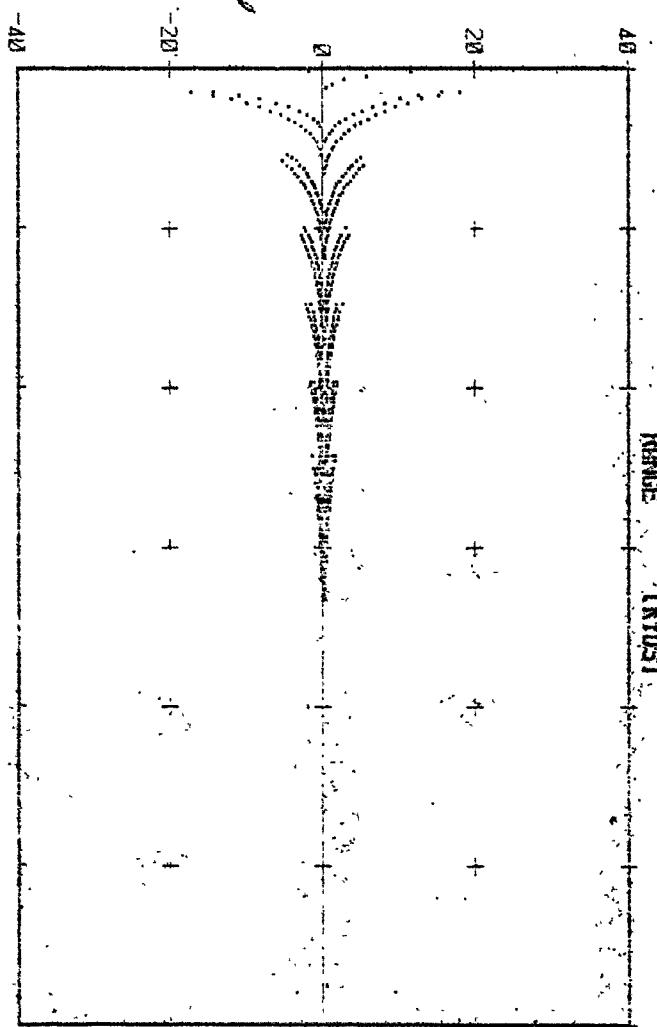
DB LOSS



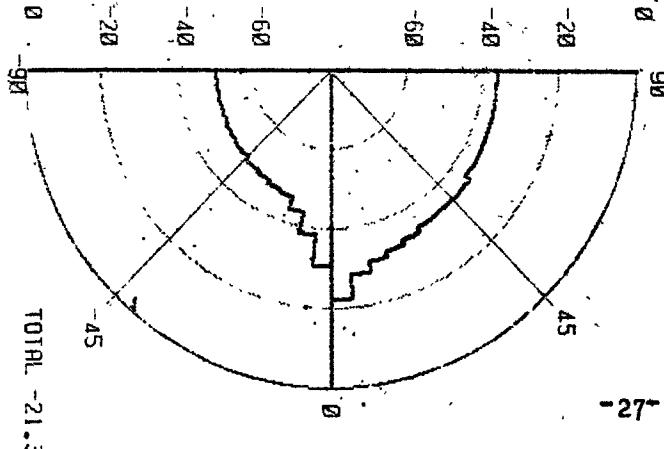
DEPTH IN METERS



ARRIVAL ANGLE



NOISE (DB)



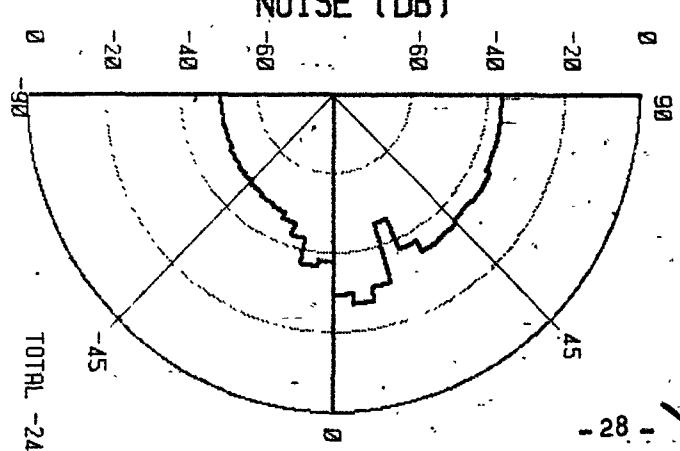
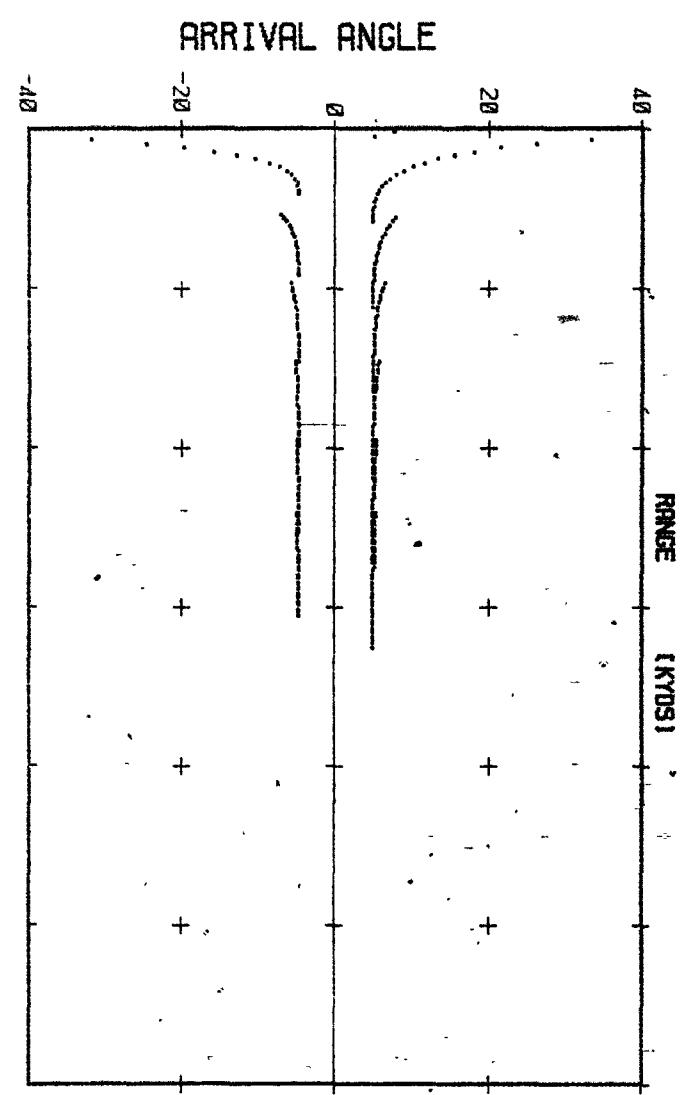
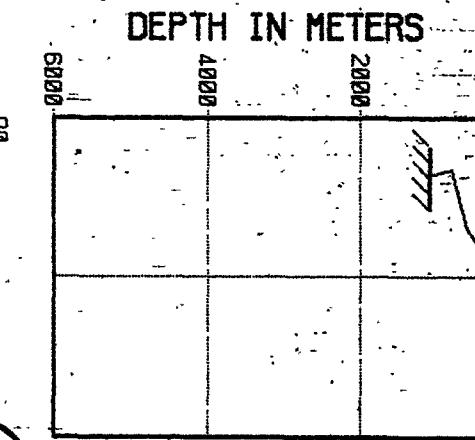
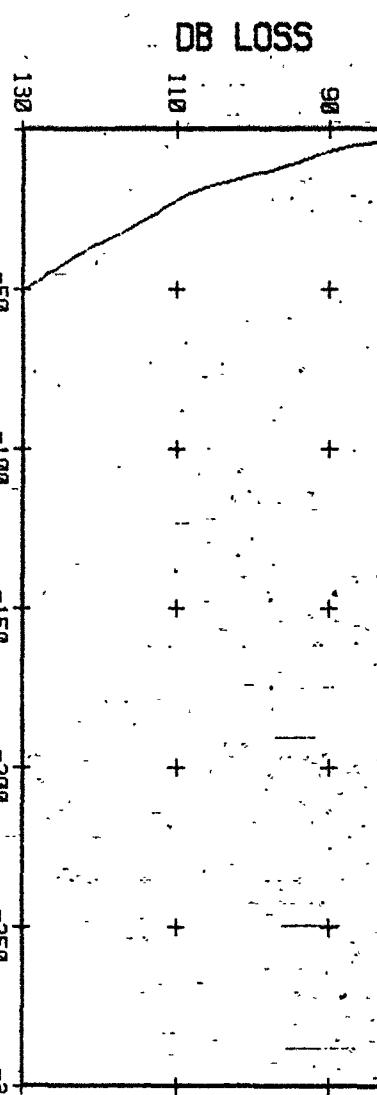
TOTAL -21.3 dB

-27

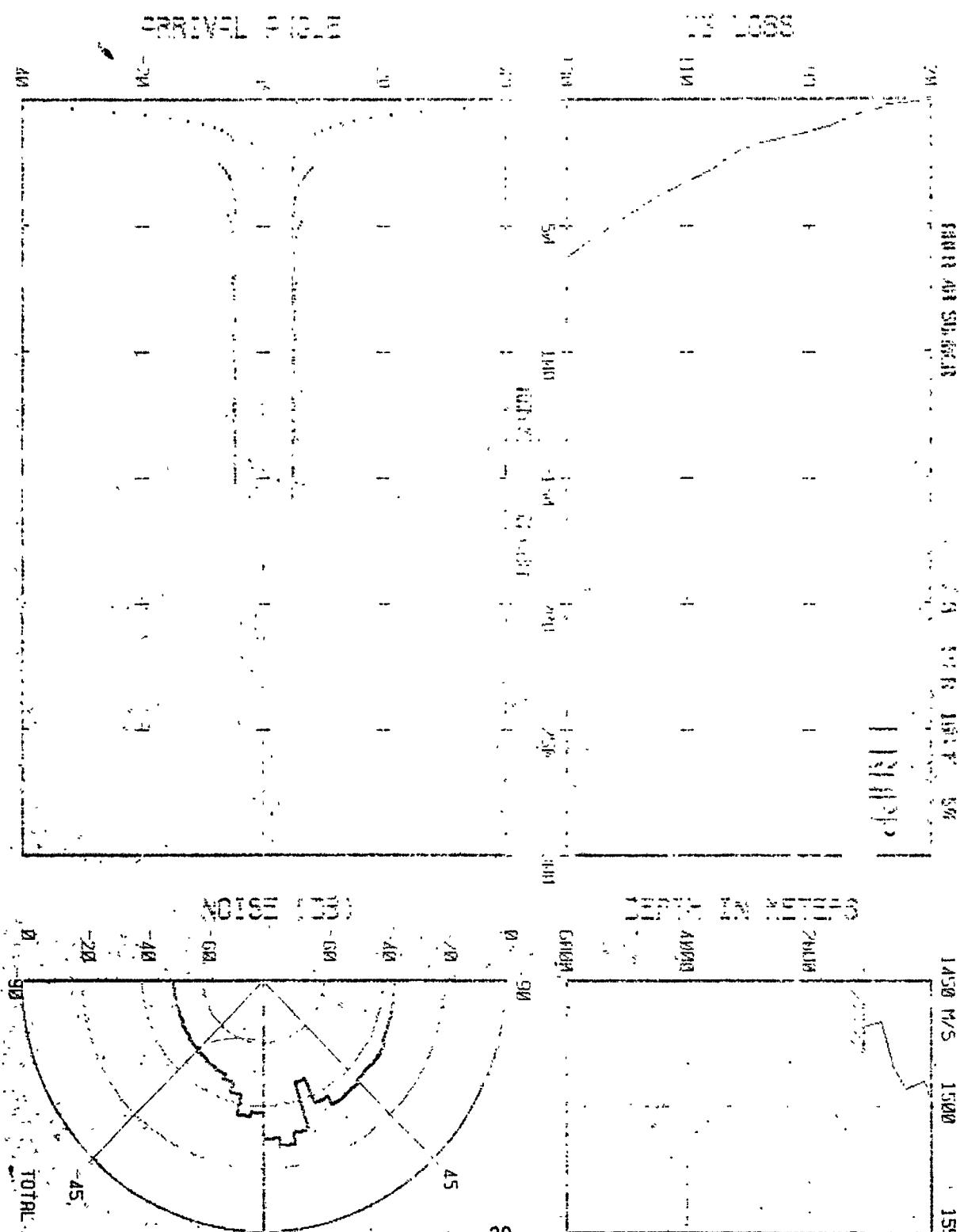
76 3 28 R 188 F 50 1150 m/s 1500 1550



URAPP



TOTAL -24.1 DB



TOTAL -24.1 DB

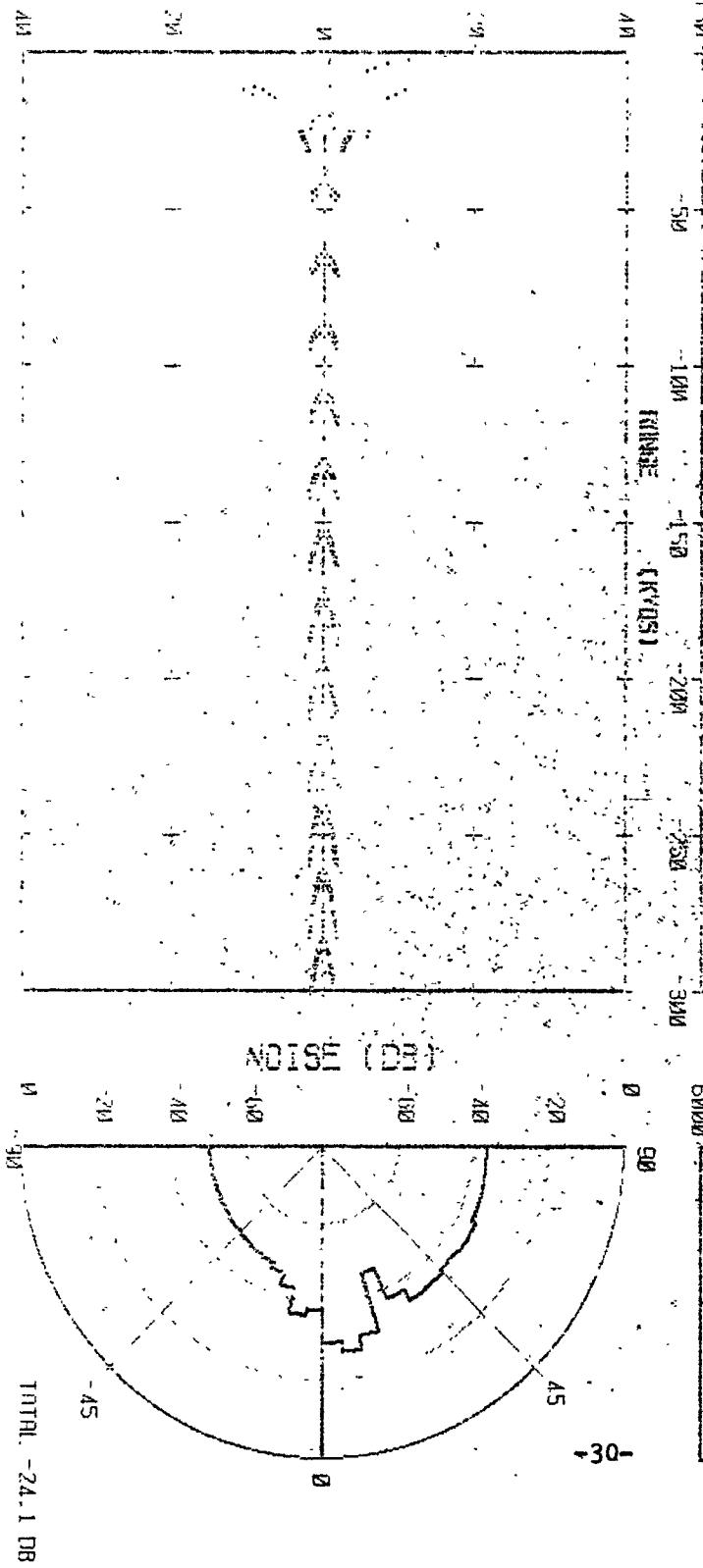
CERREVAL PAGE

33 : 1052

FRIEDRICH DÖRING

3286 ft. 113

M/S 1500 1550



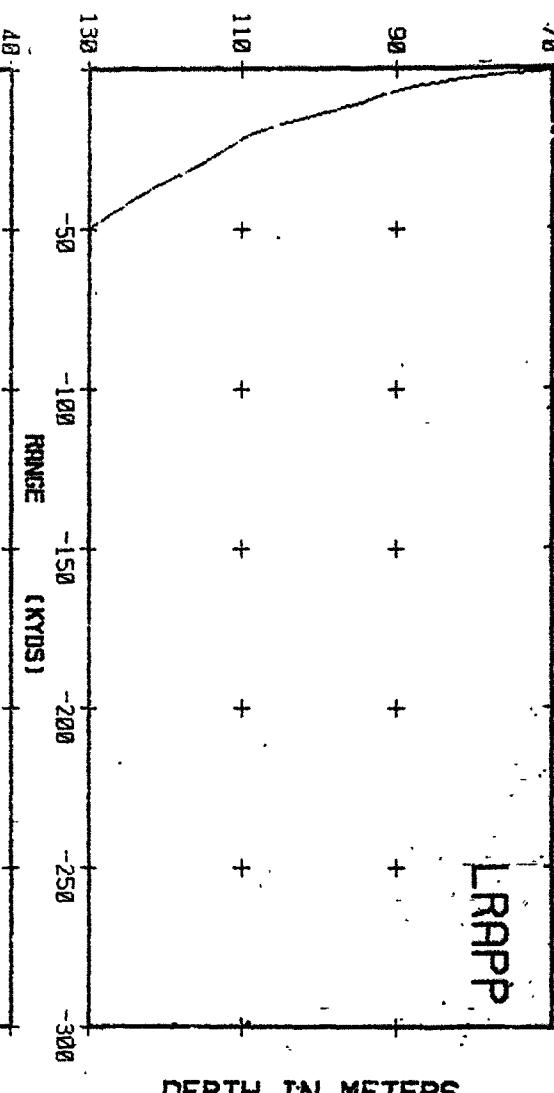
AREA AB SUMMER

S 28 N 300 F 58

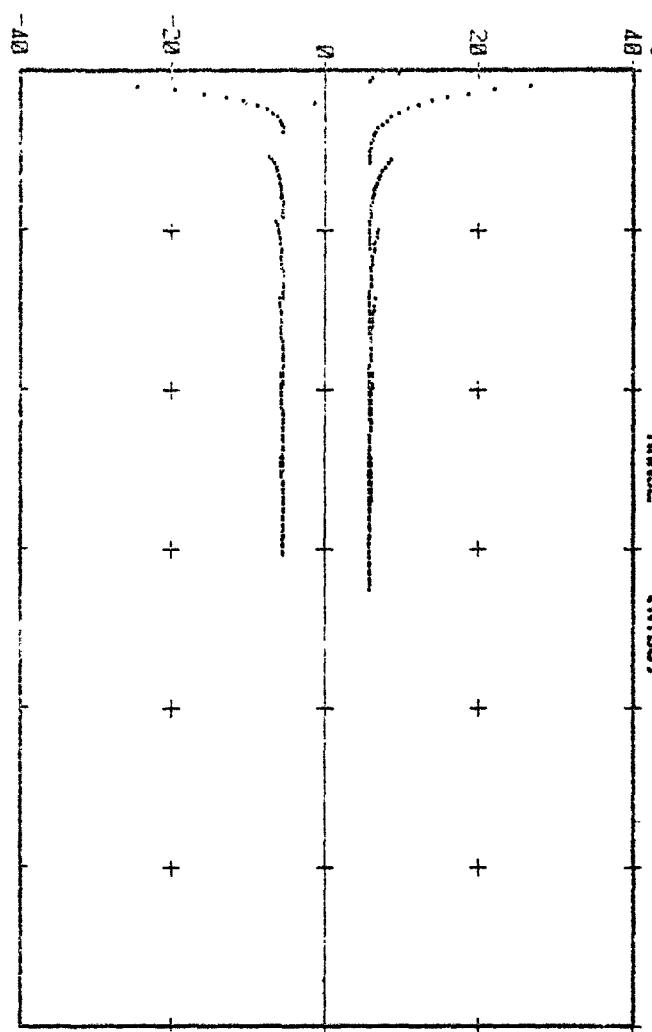
1450 M/S 1500 1550

L RAPP

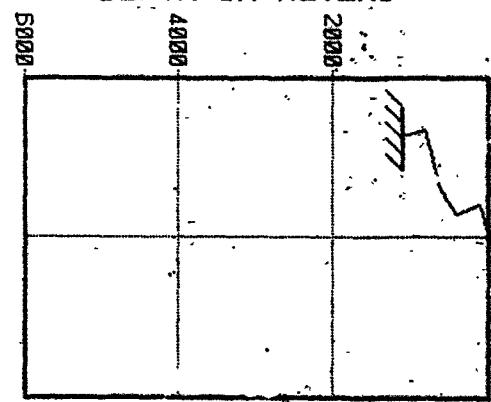
DB LOSS



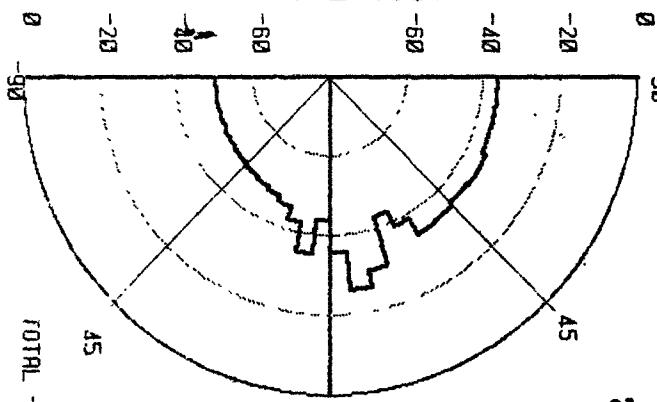
ARRIVAL ANGLE



DEPTH IN METERS



NOISE (DB)



TOTAL -24.4 DB

1450 MS - 1500

S 59 W 300 N 50

1450 MS - 1500

1500

LRCIP

LCSS

13

90

110

130

150

170

190

210

230

250

270

290

310

330

350

370

390

410

430

450

470

490

510

130  
110  
90  
70  
50  
30  
10  
0

ANGLE (DEGREES)

DEPTH IN METERS

6000

4000

2000

0

-32-

ARRIVAL ANGLE

40

20

0

20

40

60

80

100

120

140

160

180

200

220

240

260

280

300

320

340

360

380

NOISE (DB)

0

20

40

60

80

100

120

140

160

180

200

220

240

260

280

300

320

340

360

380

400

420

440

460

480

500

520

540

560

580

600

620

640

660

680

700

720

740

760

780

800

820

840

860

880

900

920

940

960

980

1000

1020

1040

1060

1080

1100

1120

1140

1160

1180

1200

1220

1240

1260

1280

1300

1320

1340

1360

1380

1400

1420

1440

1460

1480

1500

1520

1540

1560

1580

1600

1620

1640

1660

1680

1700

1720

1740

1760

1780

1800

1820

1840

1860

1880

1900

1920

1940

1960

1980

2000

2020

2040

2060

2080

2100

2120

2140

2160

2180

2200

2220

2240

2260

2280

2300

2320

2340

2360

2380

2400

2420

2440

2460

2480

2500

2520

2540

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3000

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3080

3100

3120

3140

3160

3180

3200

3220

3240

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3800

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3880

3900

3920

3940

3960

3980

4000

4020

4040

4060

4080

4100

4120

4140

4160

4180

4200

4220

4240

4260

4280

4300

4320

4340

4360

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4500

4520

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4560

4580

4600

4620

4640

46

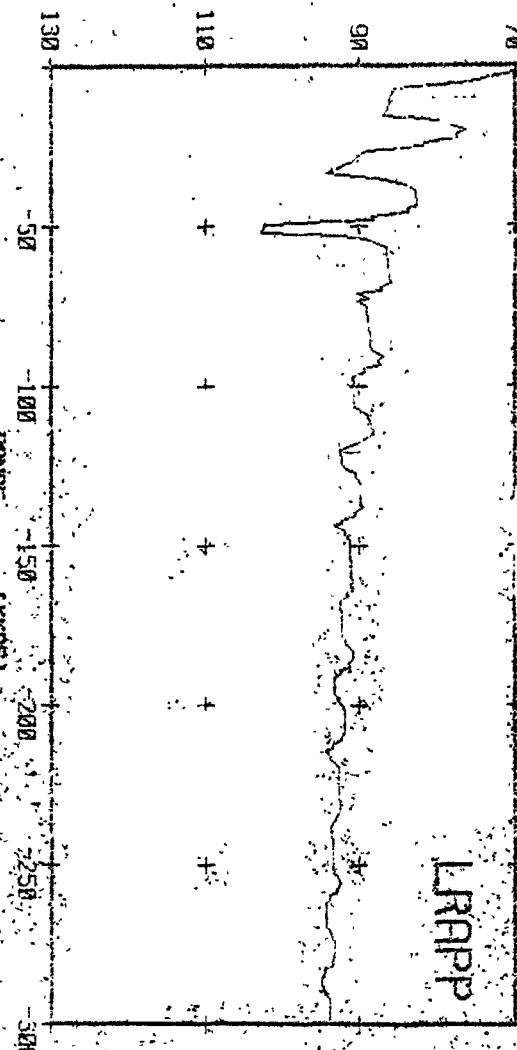
FREQ 48 SUMMER

500' 2640' 300' F 50'

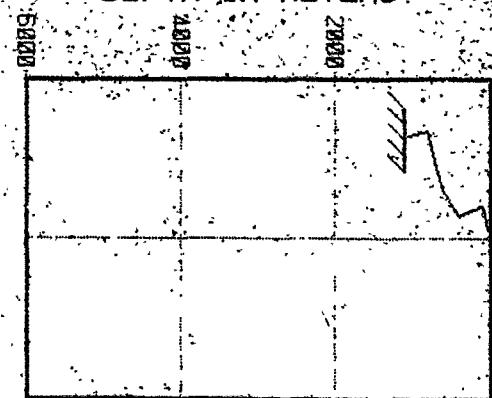
1500' 1500' 1500'

LRAPP

DB LOSS

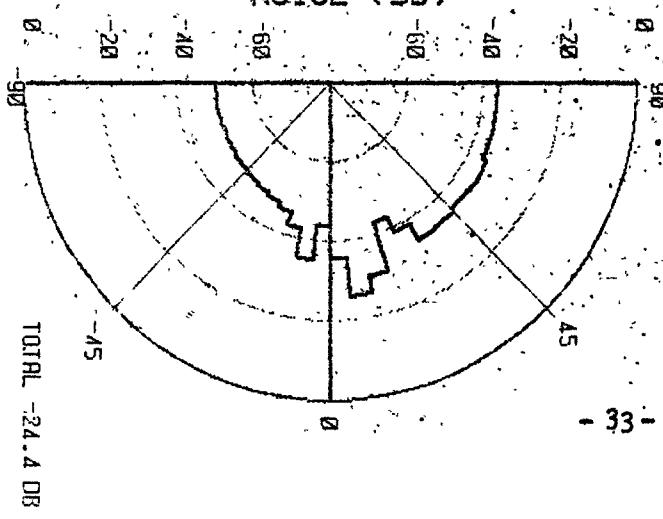
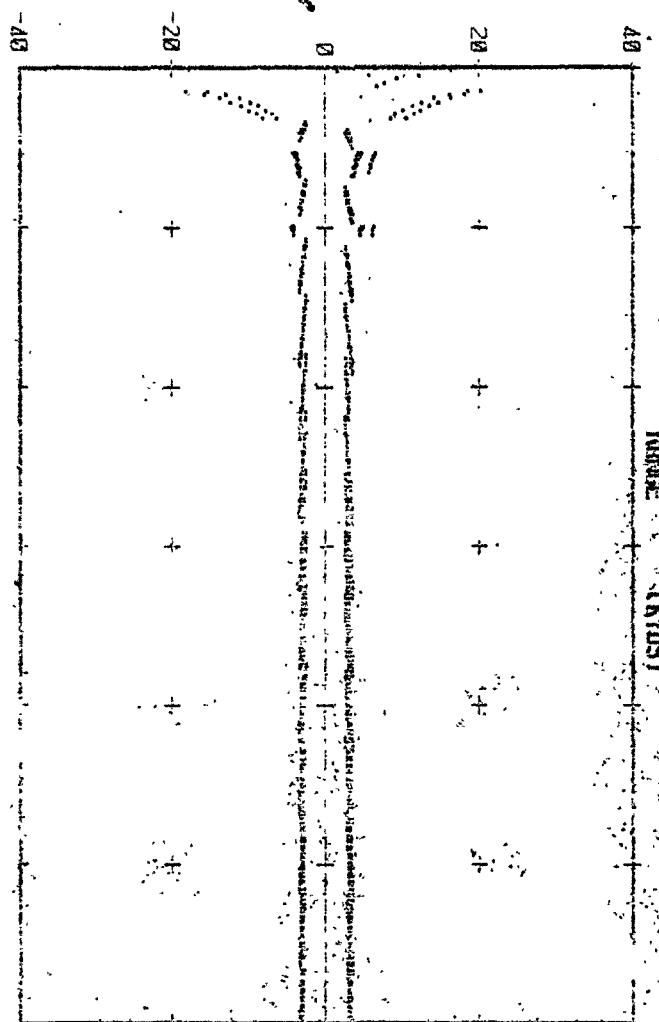


DEPTH IN METERS



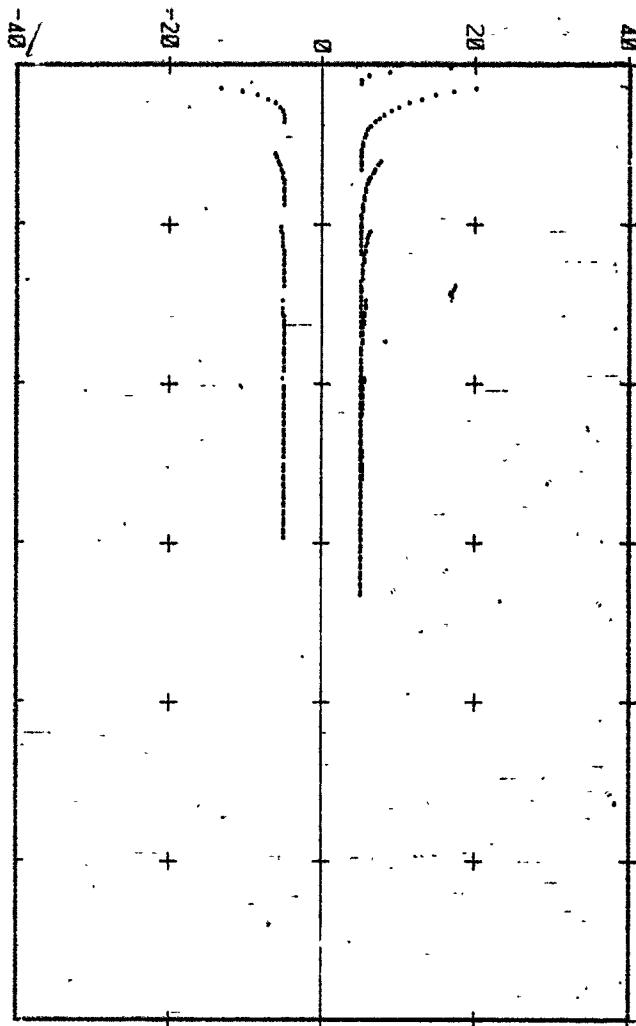
NOISE (DB)

ARRIVAL ANGLE

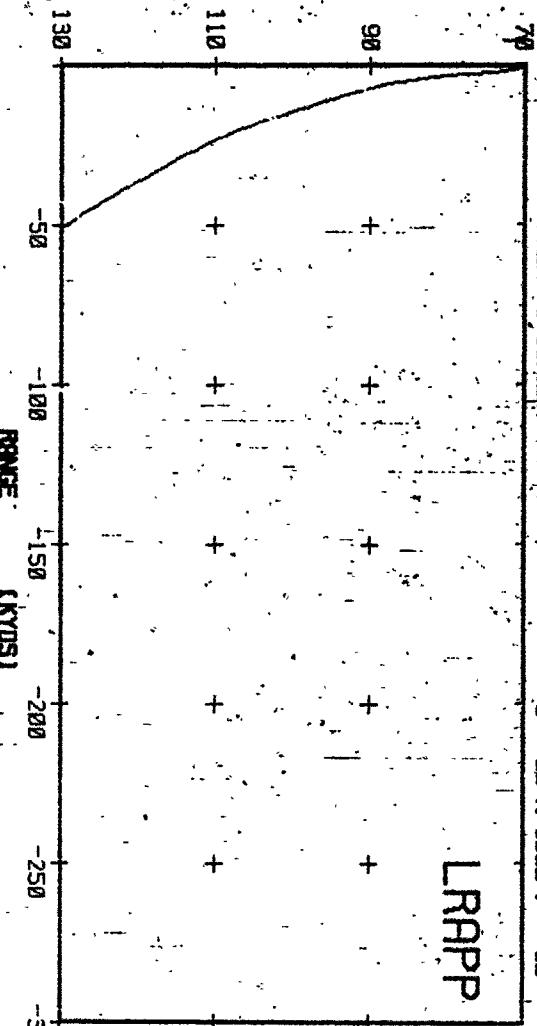


-33-

ARRIVAL ANGLE

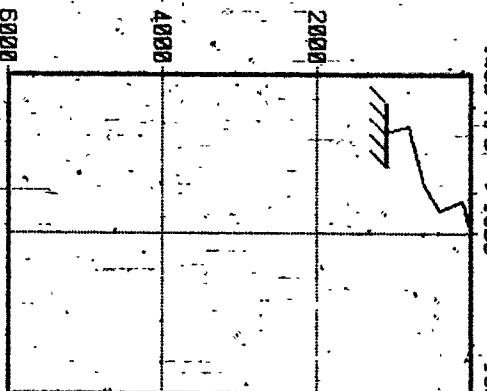


DB LOSS



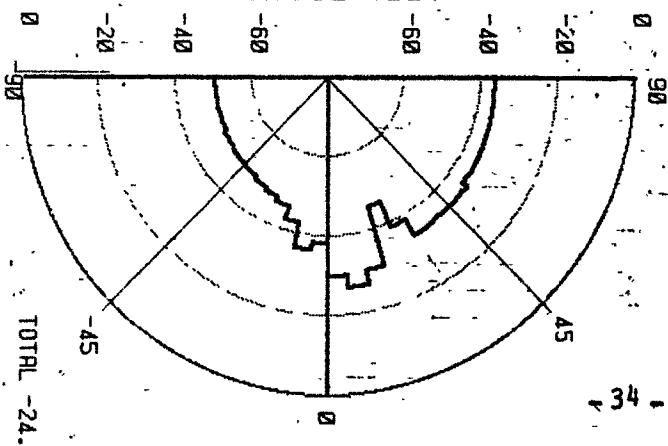
L RAPP

DEPTH IN METERS



1450 M/S 1500 1550

NOISE (DB)



AIRER AB SUMMER

S 25° 56' R 10800 F 59°

1430 M/S 1500 1550

LRRPP

DB LOSS

90

110

130

150

170

190

210

230

250

270

290

310

330

350

370

390

410

430

450

470

490

510

530

550

570

590

610

630

650

670

690

710

730

750

770

790

810

830

850

870

890

910

930

950

970

990

1010

1030

1050

1070

1090

1110

1130

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1170

1190

1210

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1850

1870

1890

1910

1930

1950

1970

1990

2010

2030

2050

2070

2090

2110

2130

2150

2170

2190

2210

2230

2250

2270

2290

2310

2330

2350

2370

2390

2410

2430

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2930

2950

2970

2990

3010

3030

3050

3070

3090

3110

3130

3150

3170

3190

3210

3230

3250

3270

3290

3310

3330

3350

3370

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3870

3890

3910

3930

3950

3970

3990

4010

10

30

50

70

90

110

130

150

170

190

210

230

250

270

290

310

330

350

370

390

410

430

450

470

490

510

530

550

570

590

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910

930

950

970

990

1010

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1190

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1870

1890

1910

1930

1950

1970

1990

2010

2030

2

REF ID: S100

1968-200 R 1964 T 53

S1150-M5

1500

1550

LOSS

110

100

90

80

70

60

50

40

30

20

10

0

110

100

90

80

70

60

50

40

30

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30

20

10

0

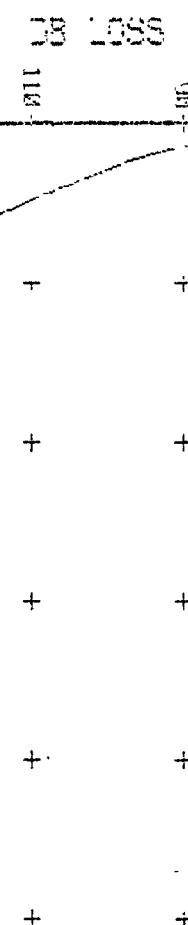
110 100 90 80 70 60 50 40 30 20 10

AFTER ABS SUMMER

S 20 R 1312 F 50

1450 M/S 1500 1550

LRAFP



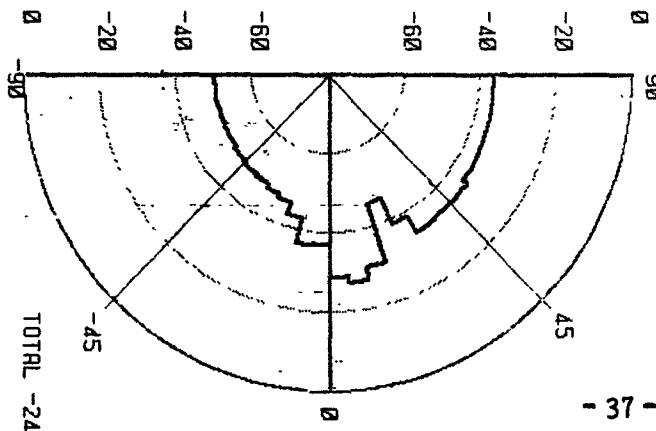
DEPTH IN METERS

2000 4000



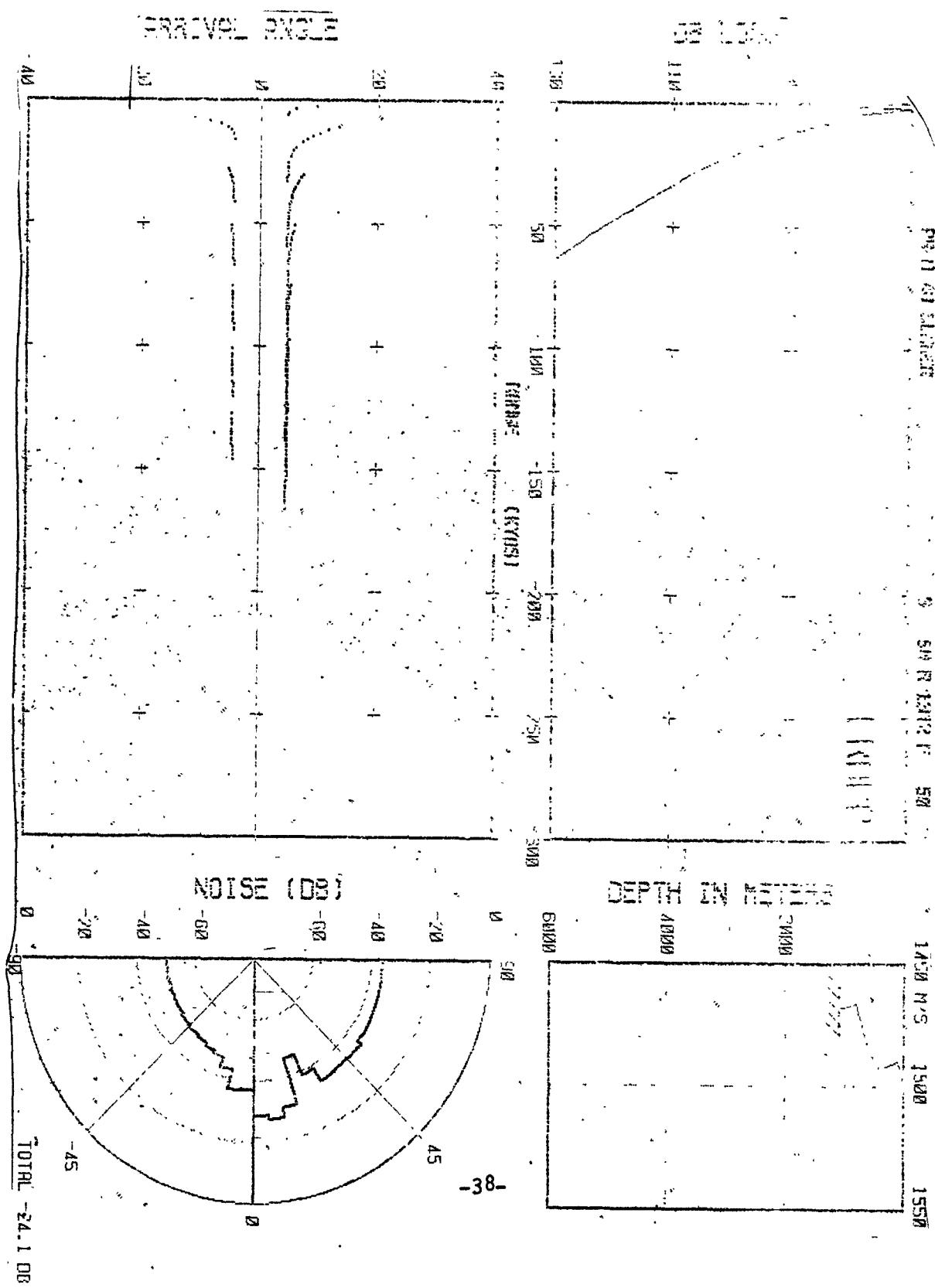
NOISE (DB)

0 90



-37-

TOTAL -24.1 DB

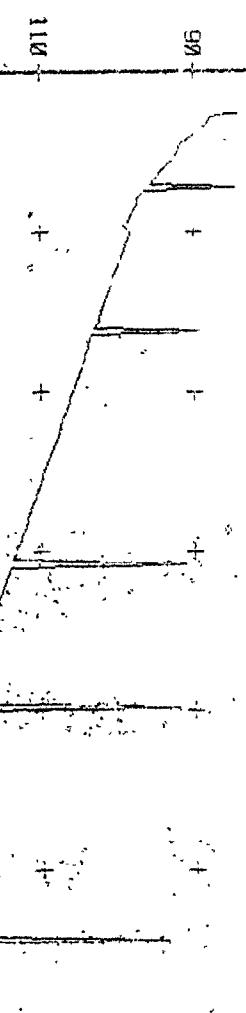


FIRIN AB SUMMER

1450 1455 1500 1550

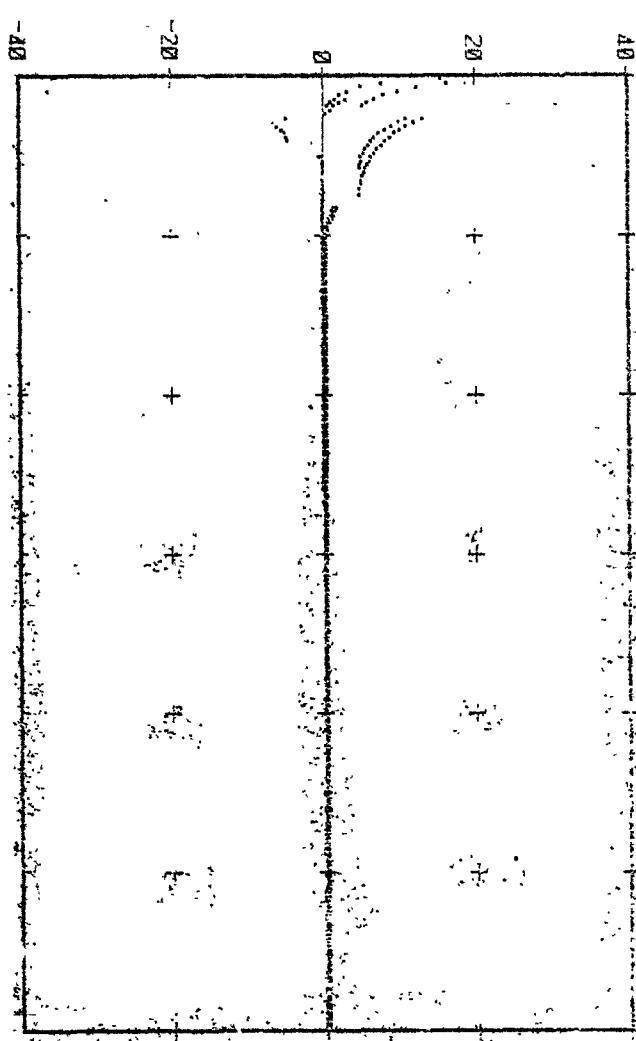
LROP

DB LOSS

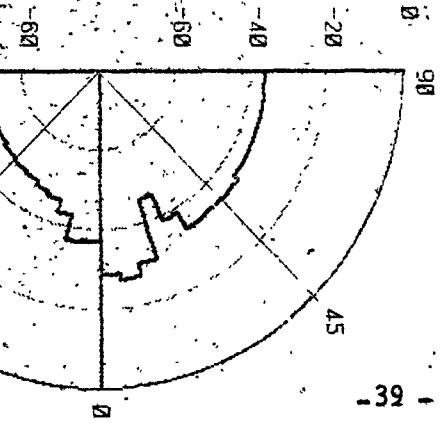


DEPTH IN FT  
0 1000 2000 3000 4000 5000 6000

ARRIVAL ANGLE



FREQUENCY (KHZ)



NOISE (dB)

TOTAL -24.1 DB.

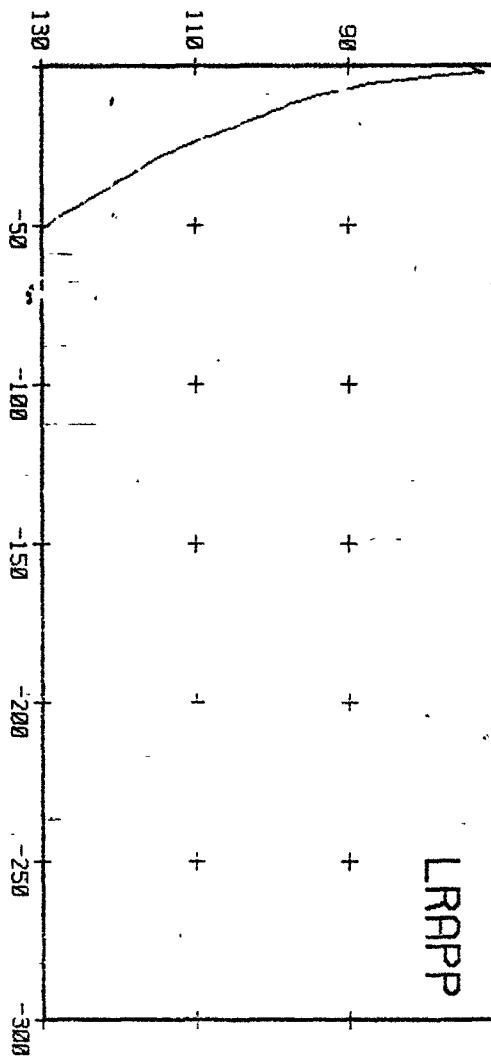
70

PAPER 4B SUMMER

S 20 R 1500 F 50

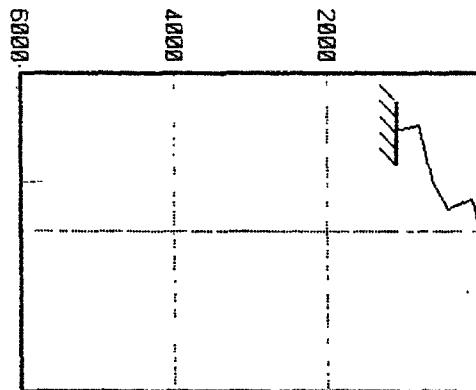
1450 M/S 1500 1550

## DB LOSS

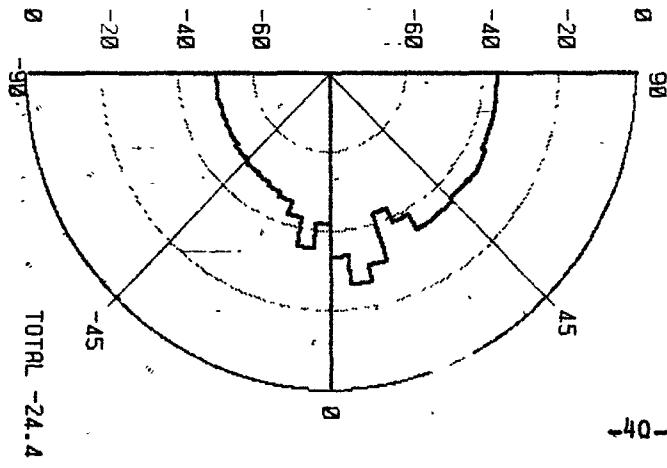
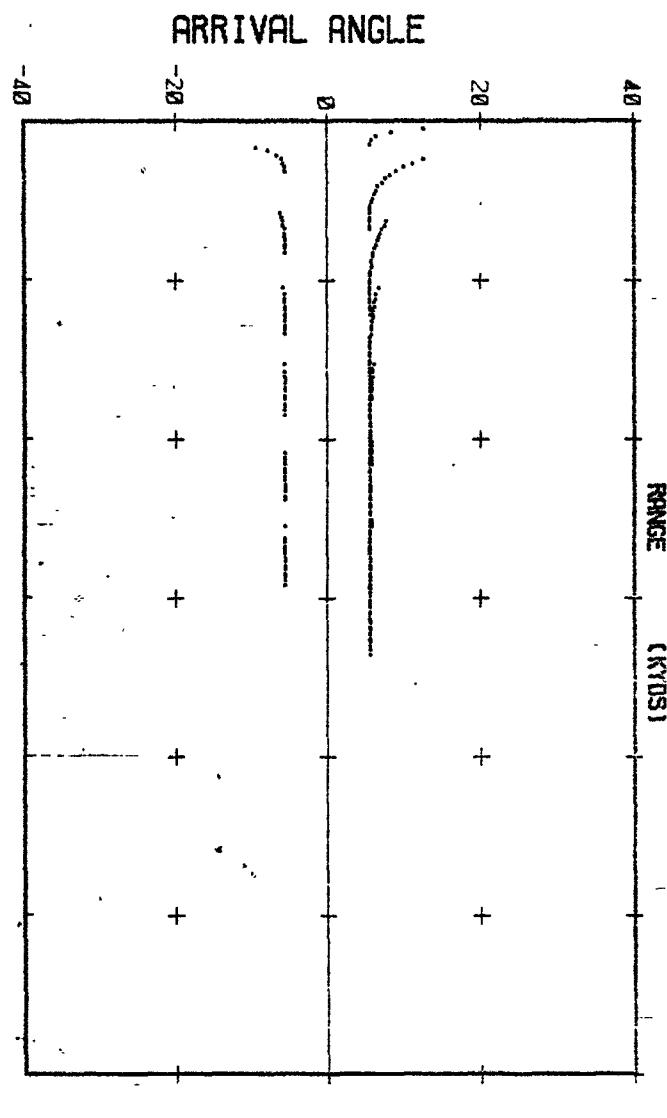


LRAPP

## DEPTH IN METERS



## NOISE (DB)



70

WATER AT SURFACE

50' 150' 100' 50'

1450 M/S. 1500 1550

LRAAPP

DB LOSS

110

100

90

80

70

60

50

40

30

20

10

0

130  
-50  
-100  
-150  
-200  
-250  
-300

RANGE (KMS)

6000  
4000  
2000

DEPTH IN METERS

4000

2000

0

-41-

ARRIVAL ANGLE

-20

-10

0

10

20

30

40

50

60

70

80

90

100

110

120

130

140

150

160

170

180

190

200

210

220

230

240

250

260

270

280

290

300

310

320

330

340

350

360

370

380

390

400

NOISE (DB)

-60

-40

-20

0

20

40

60

80

100

120

140

160

180

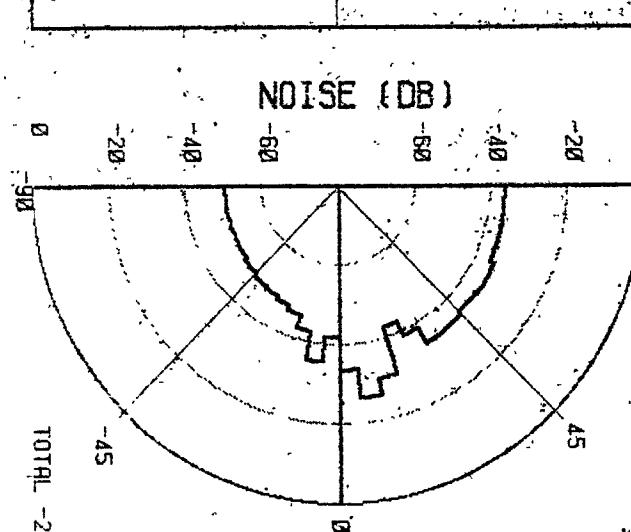
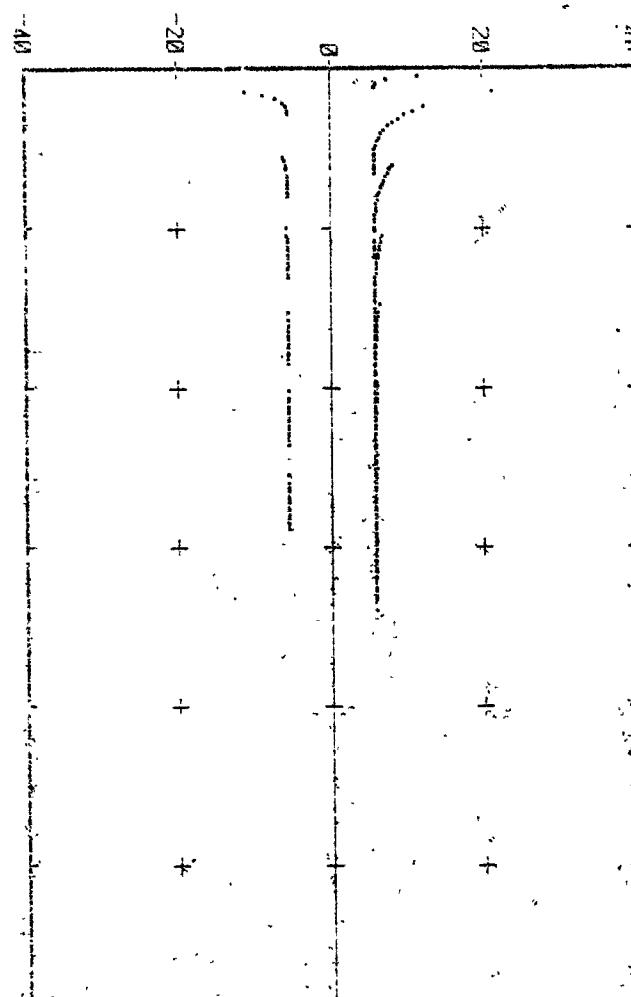
200

220

240

260

280



TOTAL -24.4 DB

FIG. 4A SUBJECT

1450 1455 1500 1550

1080

1100

1120

1140

1160

1180

1200

1220

1240

1260

1280

1300

1320

1340

1360

1380

1400

1420

1440

1460

1480

1500

1520

1540

1560

1580

1600

1620

1640

1660

1680

1700

1720

1740

1760

100

200

300

400

500

600

700

800

900

1000

1100

1200

1300

1400

1500

1600

1700

1800

1900

2000

2100

2200

2300

2400

2500

2600

2700

2800

2900

3000

3100

3200

3300

3400

100

200

300

400

500

600

700

800

900

1000

1100

1200

1300

1400

1500

1600

1700

1800

1900

2000

2100

2200

2300

2400

2500

2600

2700

2800

2900

3000

3100

3200

3300

3400

RETRIVAL ANGLE

0

10

20

30

40

50

60

70

80

90

100

110

120

130

140

150

160

170

180

190

200

NOISE (DB)

-40

-40

-40

-40

-40

-40

-40

-40

-42 -

4H

0

-20

-40

-60

-80

-100

-120

-140

-160

THRL -24.4 DB

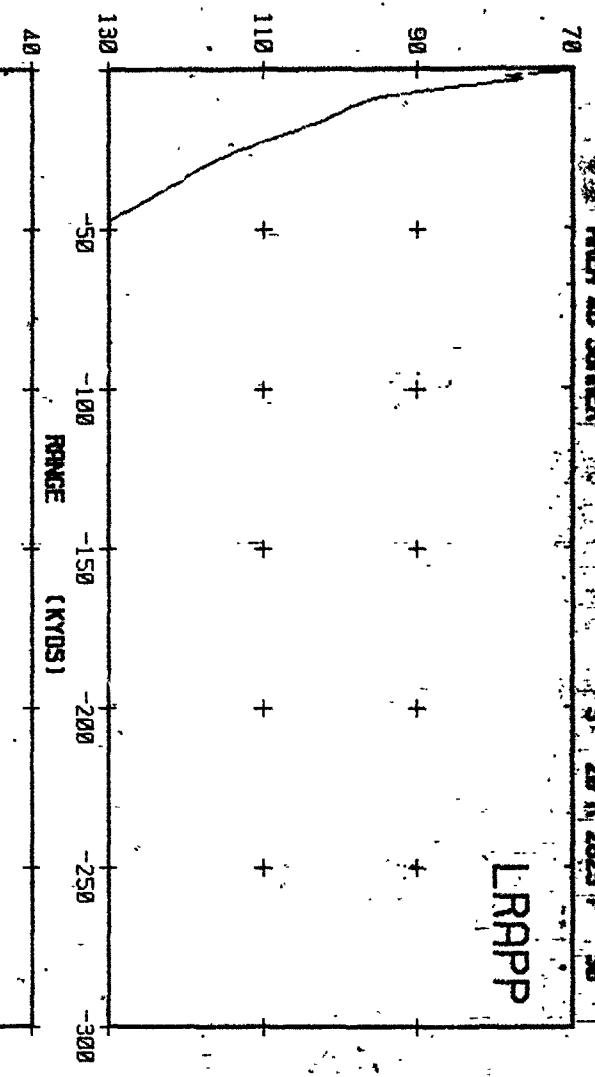
70

PER AB SUMMER S 28 R 2625 F 50

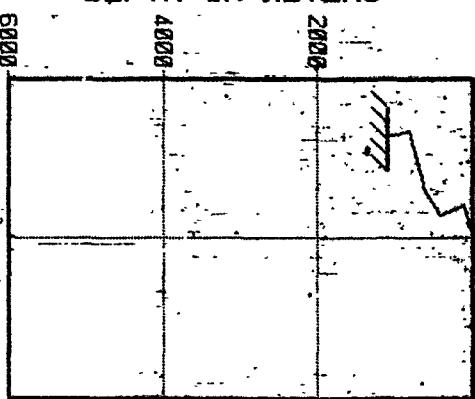
1450 WAD 1500 1650

LRAPP

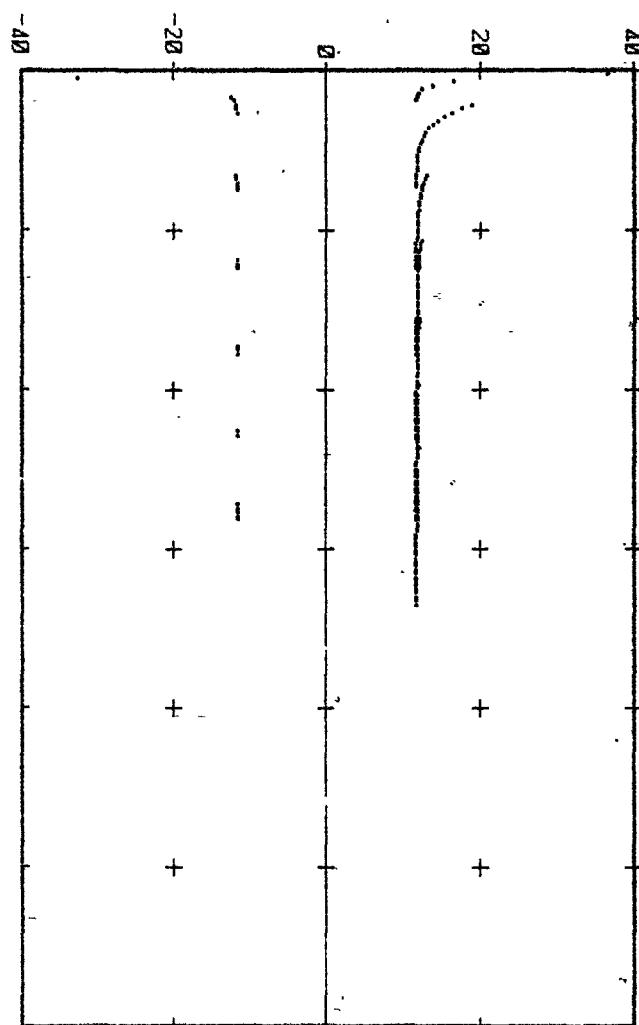
DB LOSS



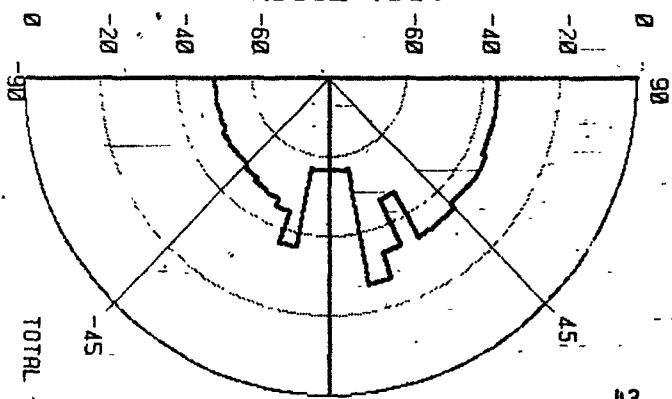
DEPTH IN METERS



ARRIVAL ANGLE



NOISE (DB)



TOTAL -25.6 DB

-43-

7A

RIVER 48 SURVEY

SERIAL NO. 50

150

1500

1550

## LRAPP

LOSS

110

130

50

100

150

200

250

300

350

400

450

500

550

600

650

700

750

800

850

900

950

DEPTH IN METERS

2000

4000

6000

NOISE (DB)

100

200

300

400

500

600

700

800

900

1000

1100

1200

1300

1400

1500

1600

1700

1800

1900

2000

2100

2200

2300

2400

2500

2600

2700

2800

2900

3000

3100

3200

3300

3400

3500

3600

3700

3800

3900

4000

4100

4200

4300

4400

4500

4600

4700

4800

4900

5000

5100

5200

5300

5400

5500

5600

5700

5800

5900

6000

6100

6200

6300

6400

6500

6600

6700

6800

6900

7000

7100

7200

7300

7400

7500

7600

7700

7800

7900

8000

8100

8200

8300

8400

8500

8600

8700

8800

8900

9000

9100

9200

9300

9400

9500

9600

9700

9800

9900

10000

10100

10200

10300

10400

10500

10600

10700

10800

10900

11000

11100

11200

11300

11400

11500

11600

11700

11800

11900

12000

12100

12200

12300

12400

12500

12600

12700

12800

12900

13000

13100

13200

13300

13400

13500

13600

13700

13800

13900

14000

14100

14200

14300

14400

14500

14600

14700

14800

14900

15000

15100

15200

15300

15400

15500

15600

15700

15800

15900

16000

16100

16200

16300

16400

16500

16600

16700

16800

16900

17000

17100

17200

17300

17400

17500

17600

17700

17800

17900

18000

18100

18200

18300

18400

18500

18600

18700

18800

18900

19000

19100

19200

19300

19400

19500

19600

19700

19800

19900

20000

20100

20200

20300

20400

20500

20600

20700

20800

20900

21000

21100

21200

21300

21400

21500

21600

21700

21800

21900

22000

22100

22200

22300

22400

22500

22600

22700

22800

22900

23000

23100

23200

23300

23400

23500

23600

23700

23800

23900

24000

24100

24200

24300

24400

24500

24600

24700

24800

24900

25000

400

600

800

1000

1200

1400

1600

1800

2000

2200

2400

2600

2800

3000

3200

3400

3600

3800

4000

4200

4400

4600

4800

5000

5200

5400

5600

5800

6000

6200

6400

6600

6800

7000

7200

7400

7600

7800

8000

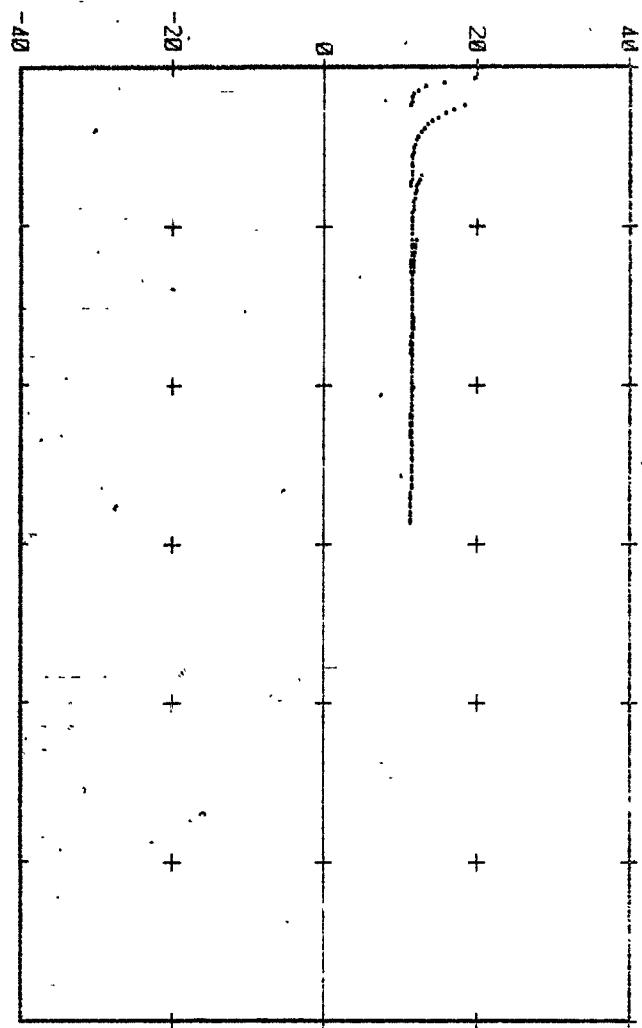
8200

8400

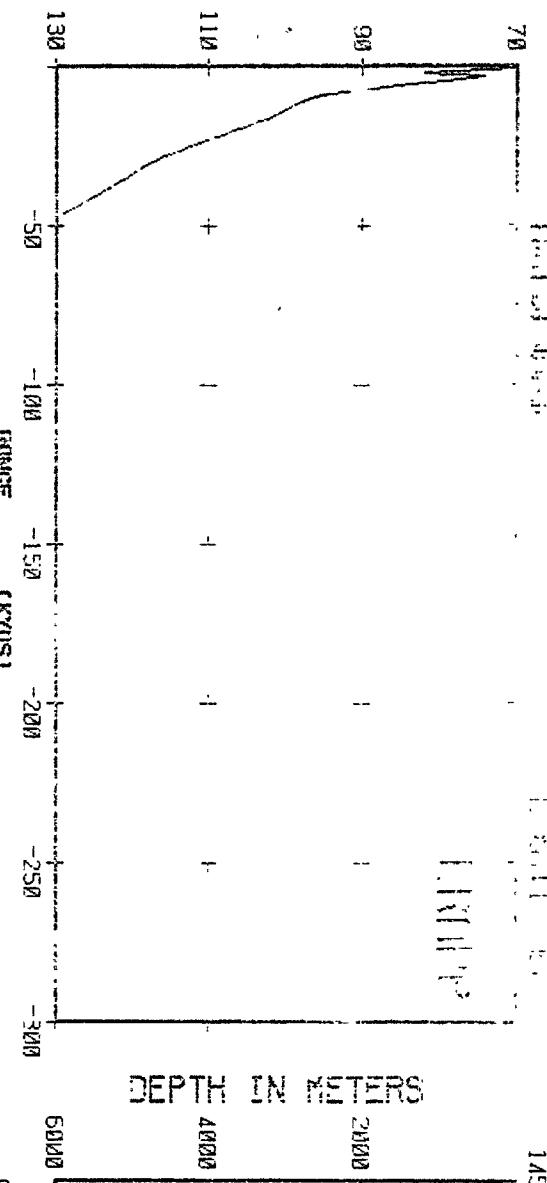
860



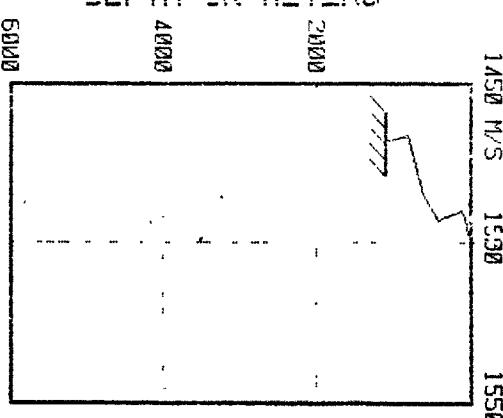
### ARRIVAL ANGLE



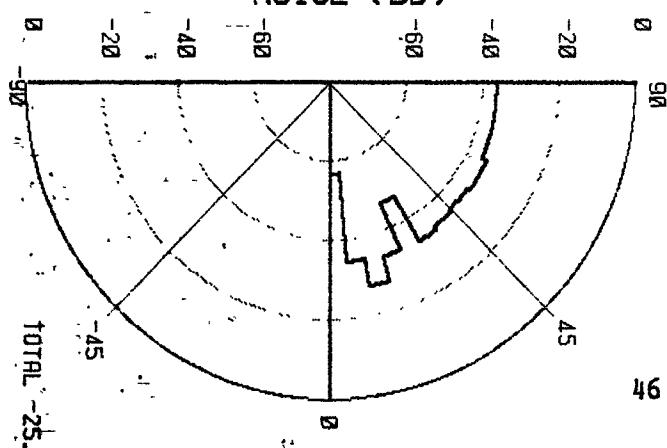
### DB LOSS



### DEPTH IN METERS



### NOISE (DB)



70

RUM AIR SURGE

3 56 R 3518 F 58

1450 M/S

1500

1550

LRFPP

LOSS IN DB

90

80

70

60

50

40

30

20

10

0

DEPTH IN METERS

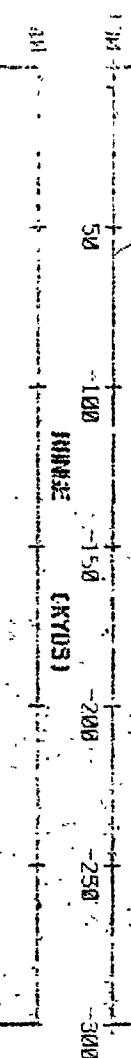
2000

4000

6000

8000

10000



0

20

40

60

80

100

120

140

160

180

200

220

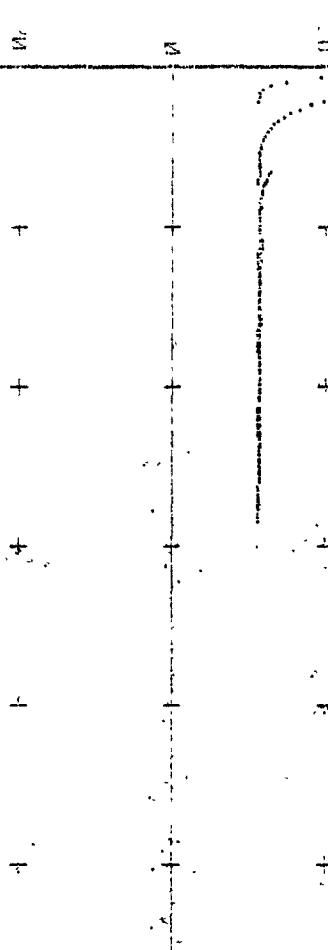
240

260

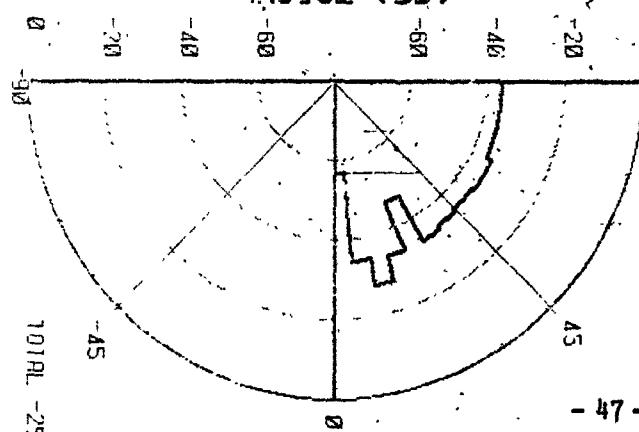
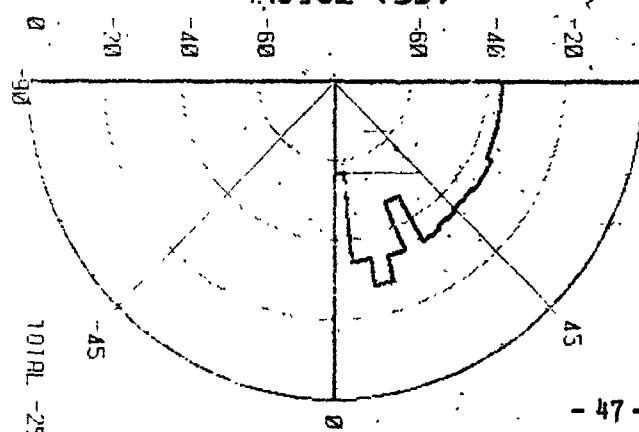
280

300

DIVERGENCE ANGLE

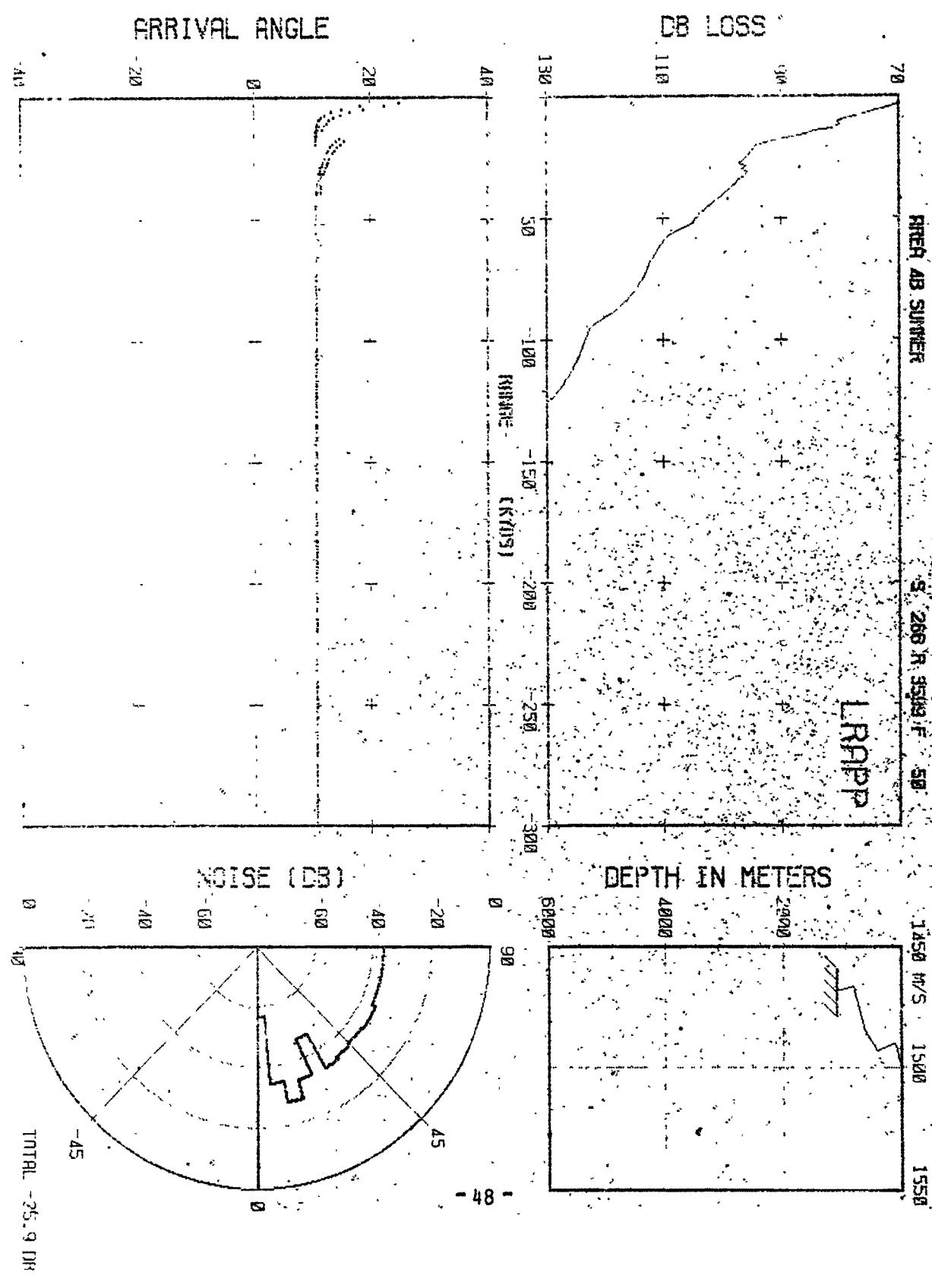


NOISE (DB)



-47-

101AL -25.9 DB



78

RIVER AB SUMMER

S 20 R 60 F 7d

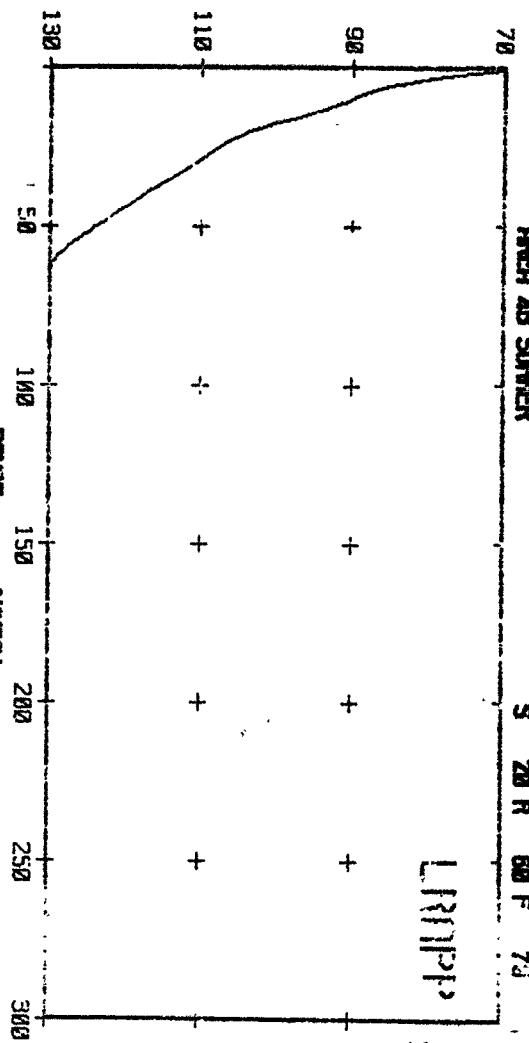
1450 M/S

1500

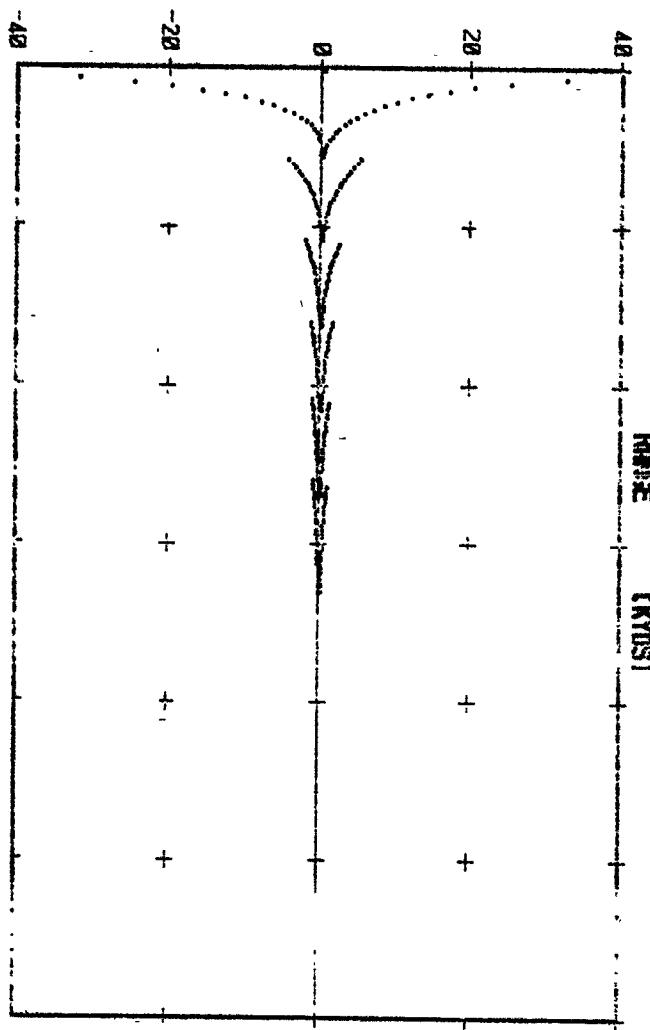
1550

1550

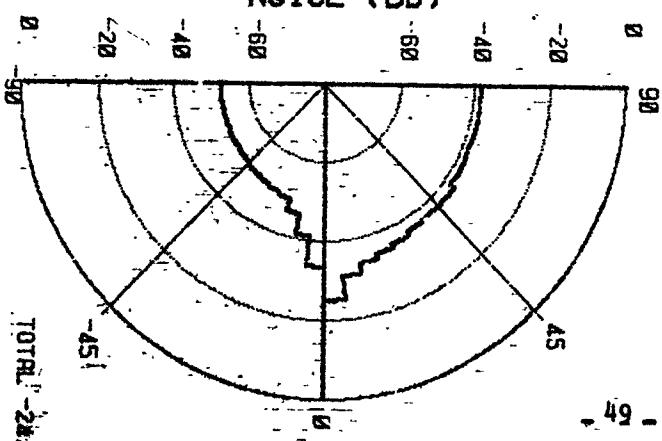
## DB LOSS



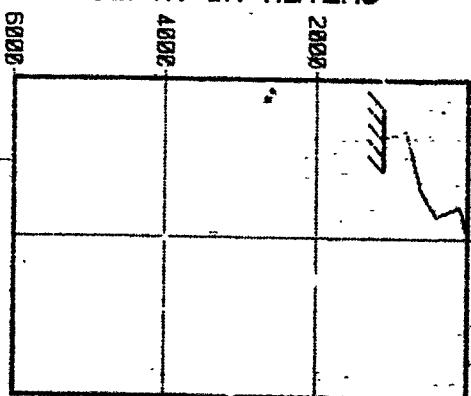
## ARRIVAL ANGLE



## NOISE (DB)



## DEPTH IN METERS



49-

TOTAL -24.2 DB

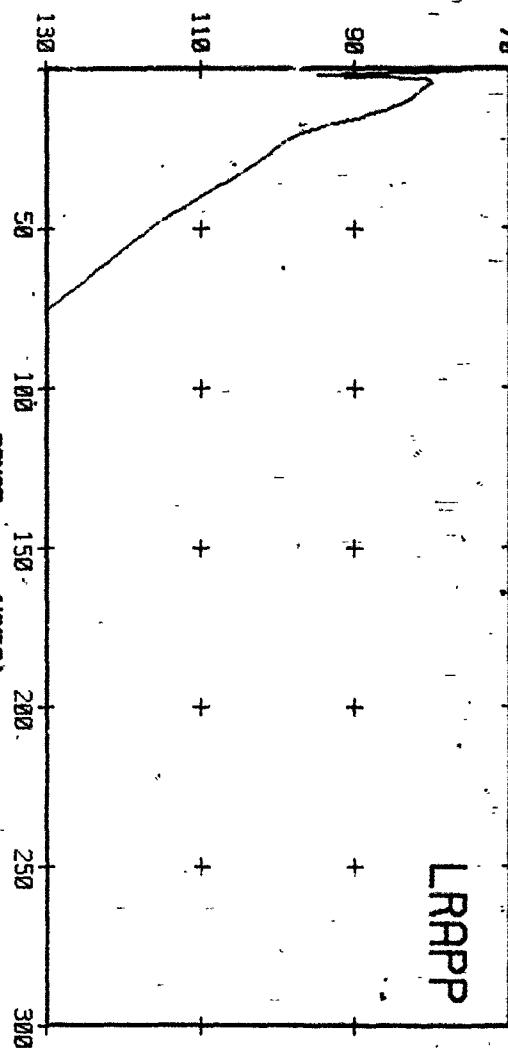
AREA 48 SUMMER

S 32 R 58 F 78

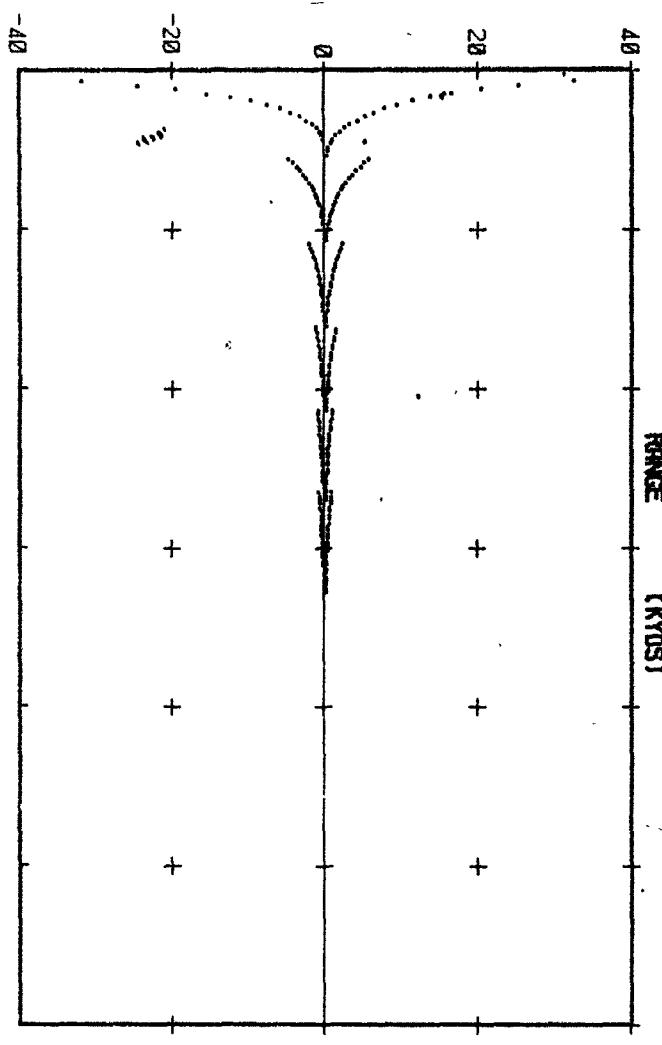
1450 M/S 1500 1550

LRAPP

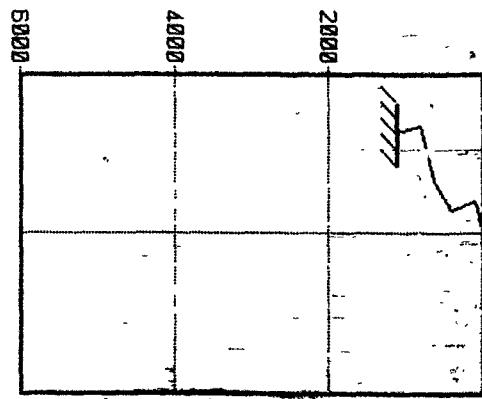
DB LOSS



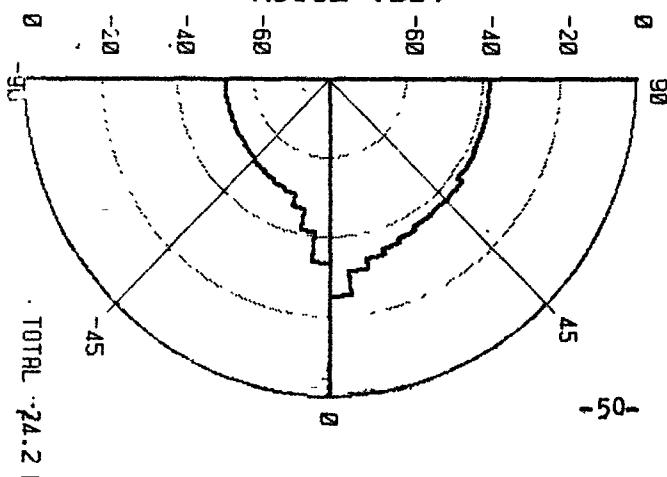
ARRIVAL ANGLE



DEPTH IN METERS



NOISE (DB)



-50-

70

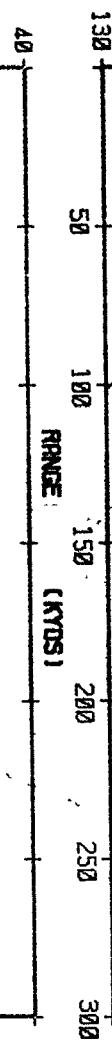
PAGER AB SUMMER

S 268 R 60 F 70

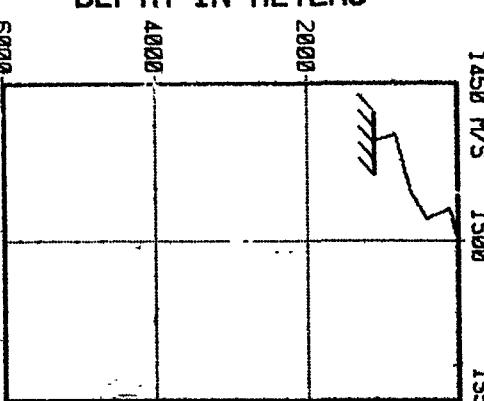
1450 M/S 1500 1550

LRAPP

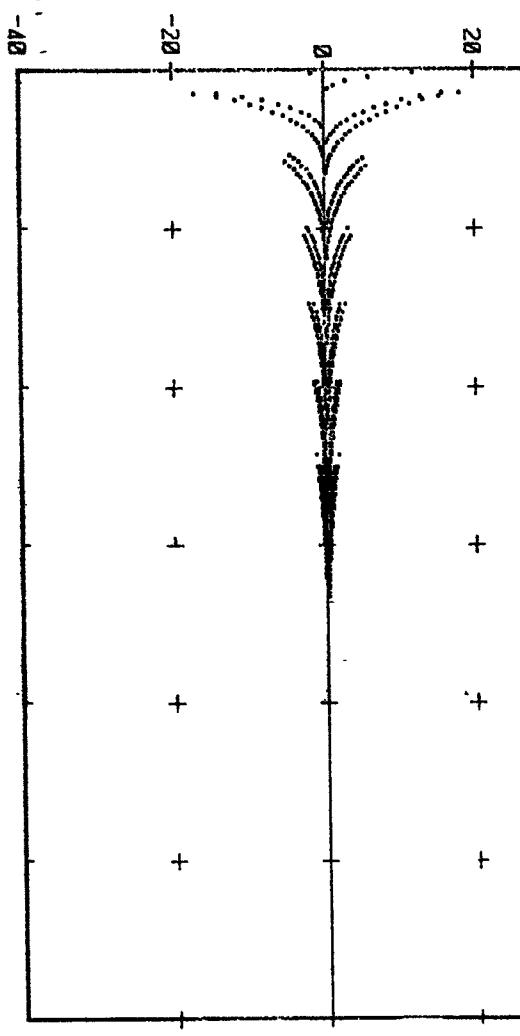
## DB LOSS



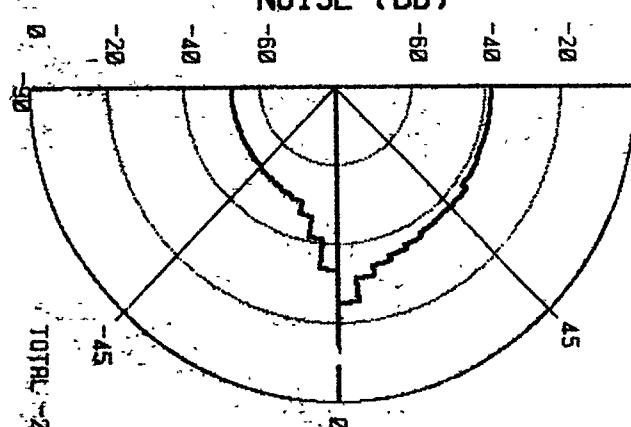
## DEPTH IN METERS



## ARRIVAL ANGLE



## NOISE (DB)



TOTAL = 24.2 dB

78

ARRIVED SUMMER

S

LRNPP

S

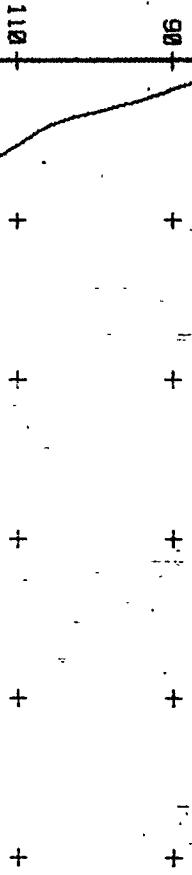
5000

M

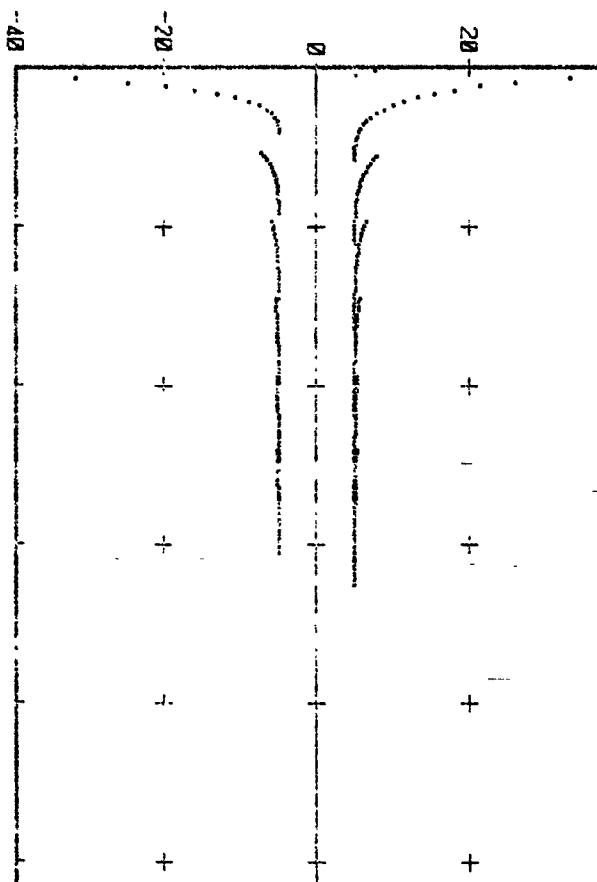
E

S

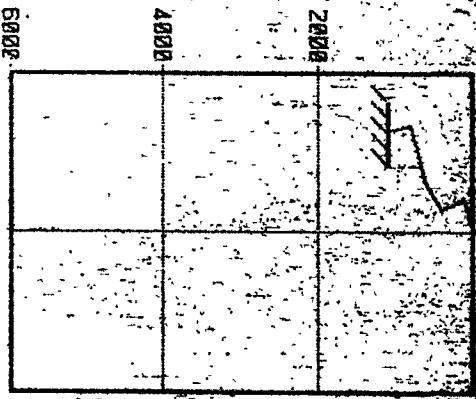
## DB LOSS



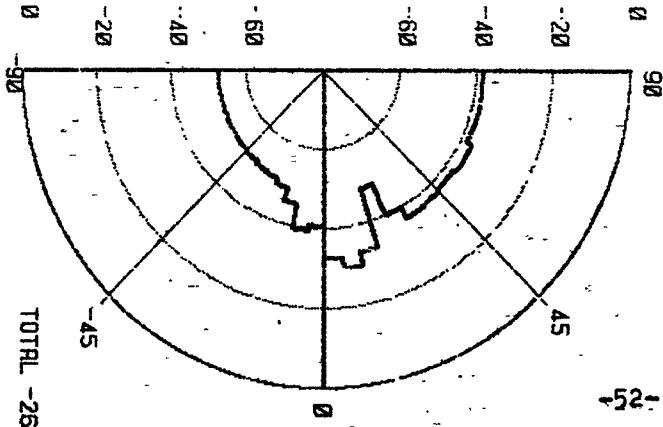
## ARRIVAL ANGLE



## DEPTH IN METERS



## NOISE (DB)



-52-

70

AREA AB SUMMER

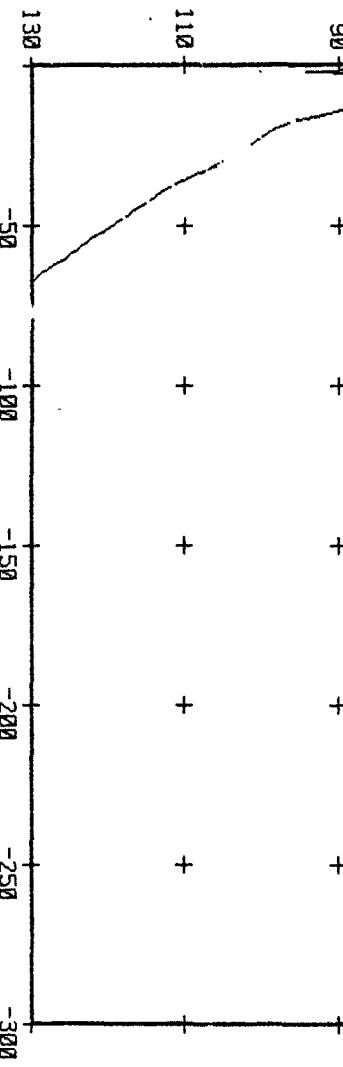
S 50 R 168 F 70

1450 M/S 1500

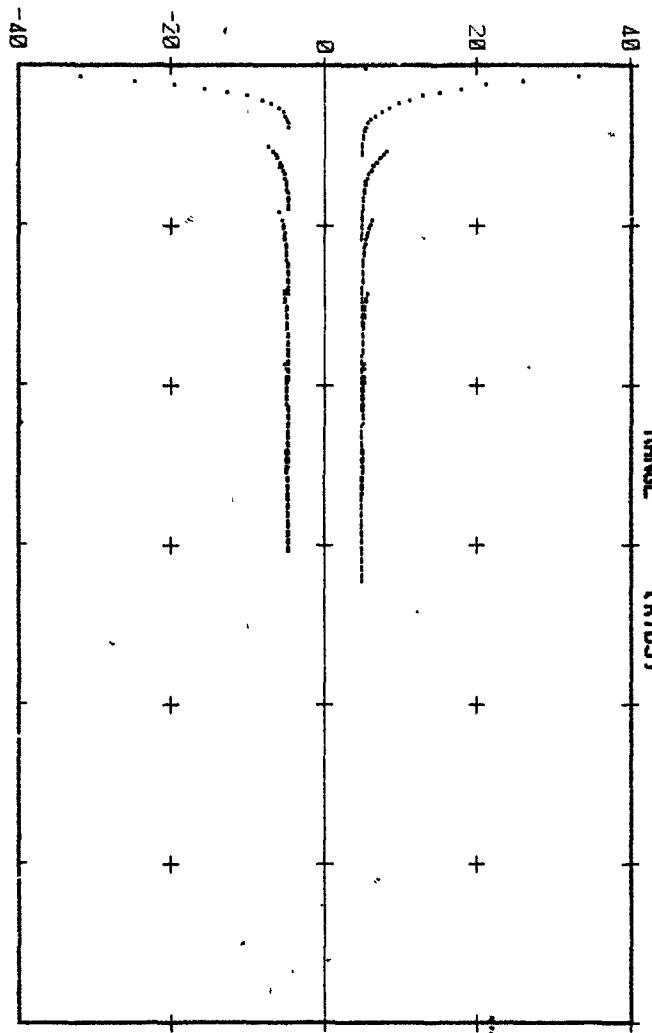
1550

## DB LOSS

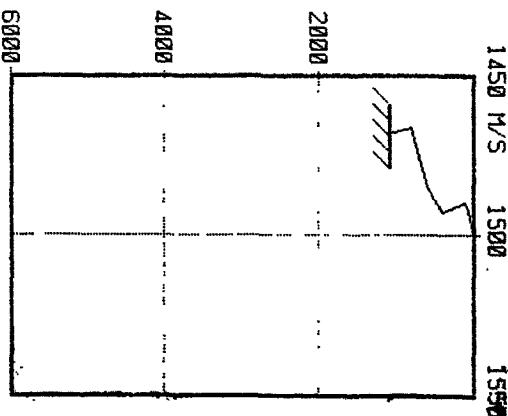
LRAPP



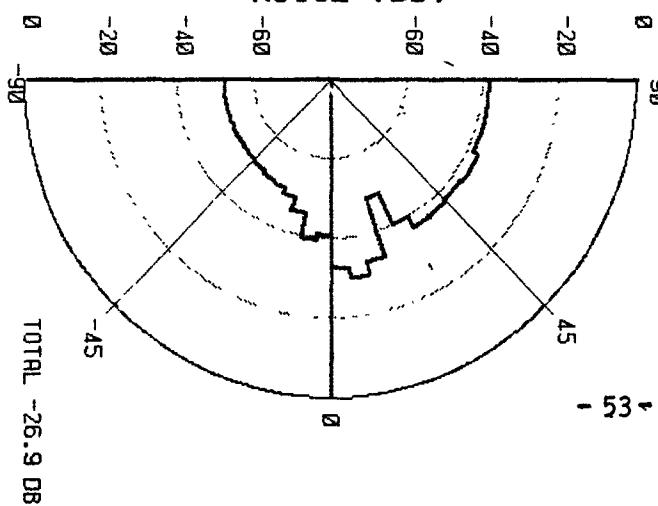
## ARRIVAL ANGLE



## DEPTH IN METERS

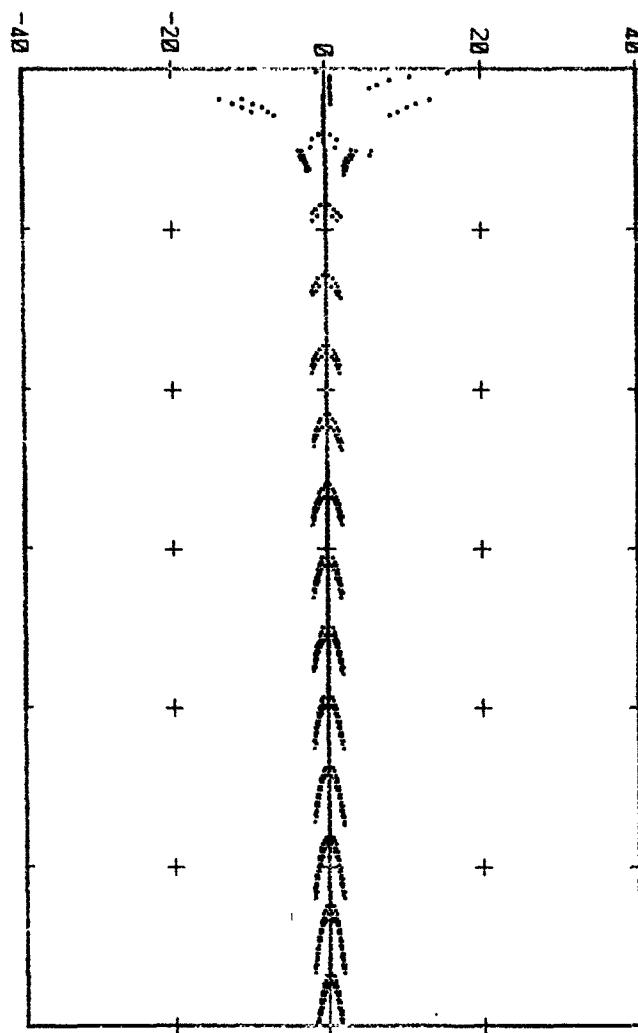


## NOISE (DB)

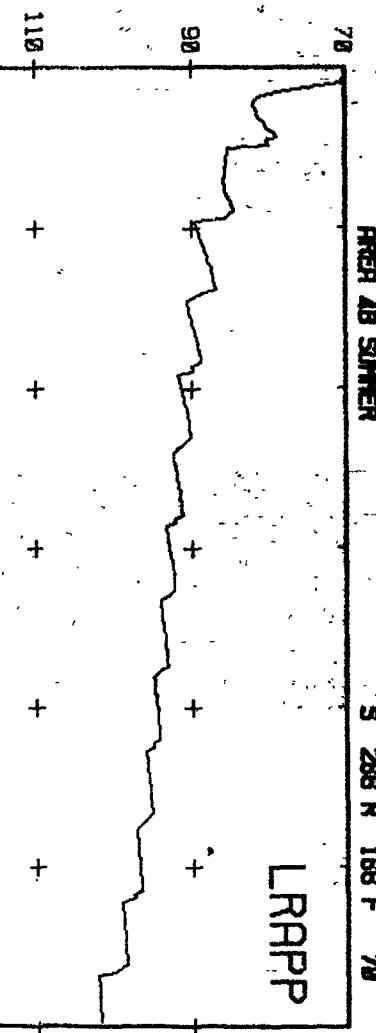


TOTAL -26.9 DB

ARRIVAL ANGLE

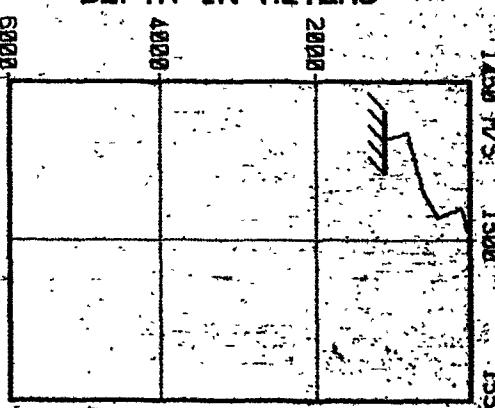


DB LOSS

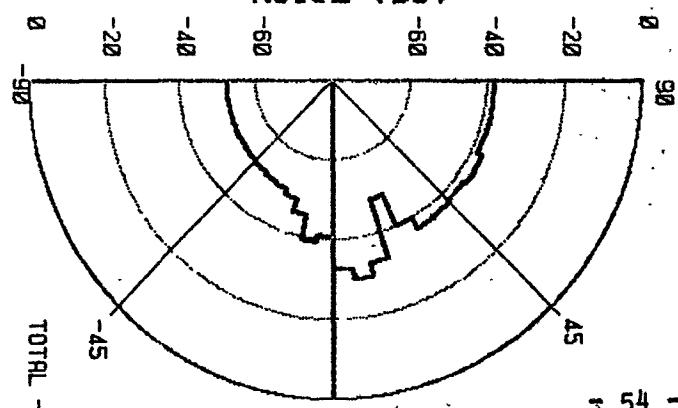


L RAPP

DEPTH IN METERS



NOISE (DB)



7B

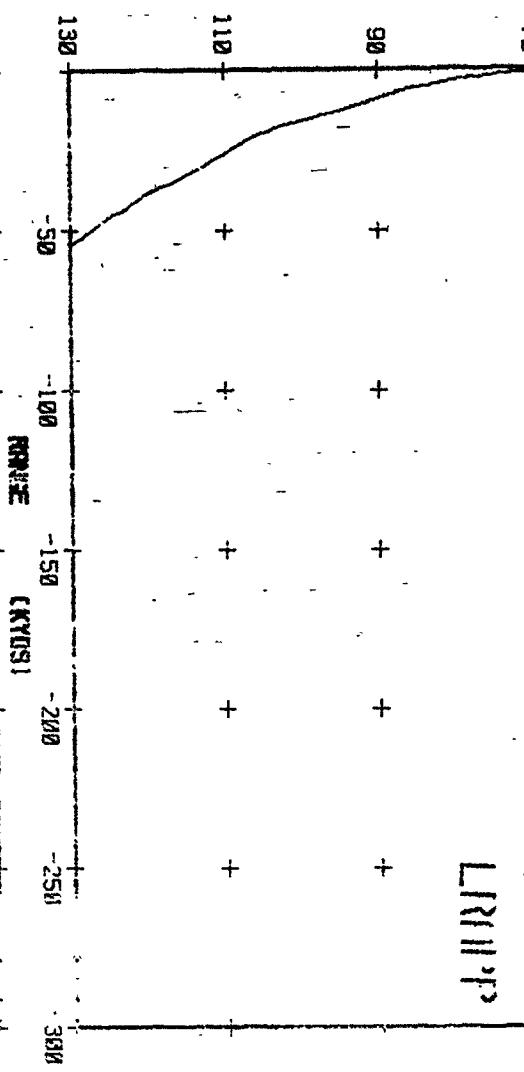
AREA 48 SUMMER

S 20 R 30 F 7B

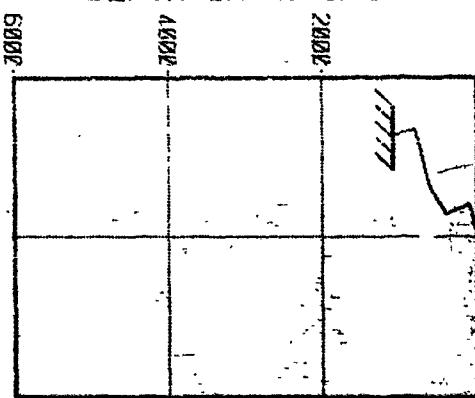
1450 M/S 1500 1550

LRLHP

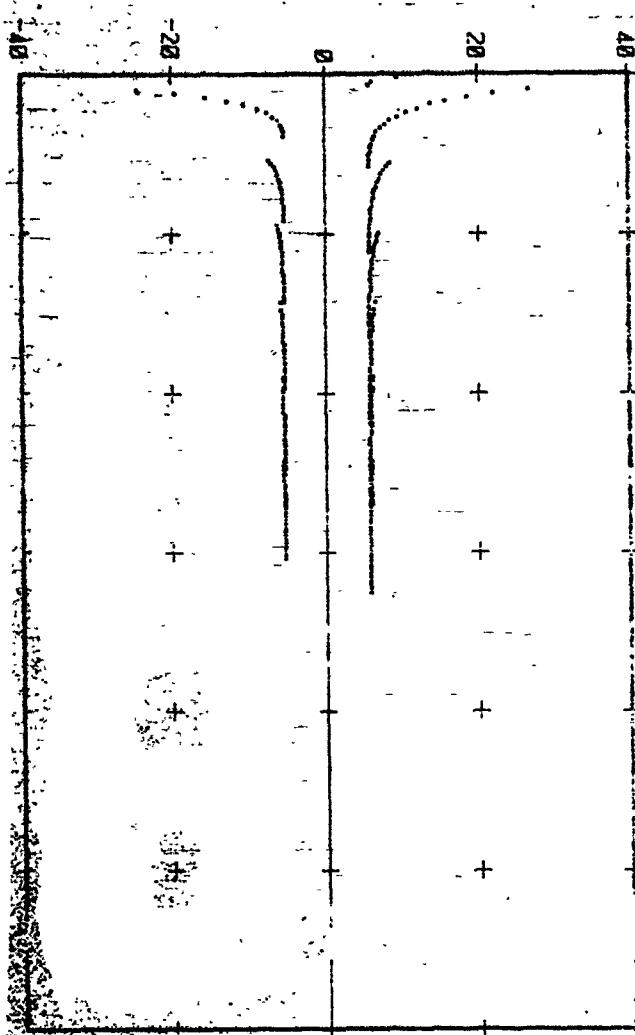
## DB LOSS



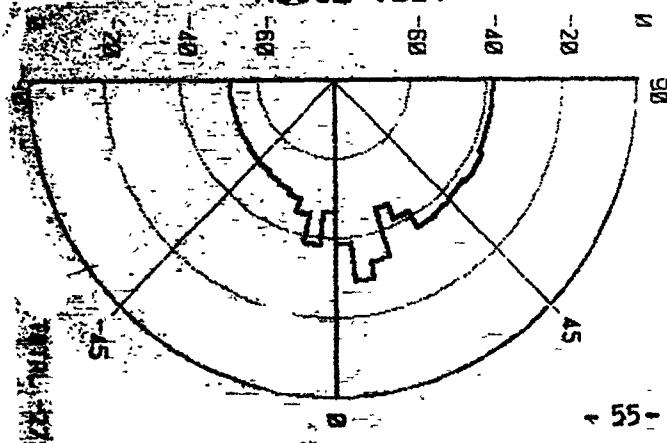
## DEPTH IN METERS



## ARRIVAL ANGLE

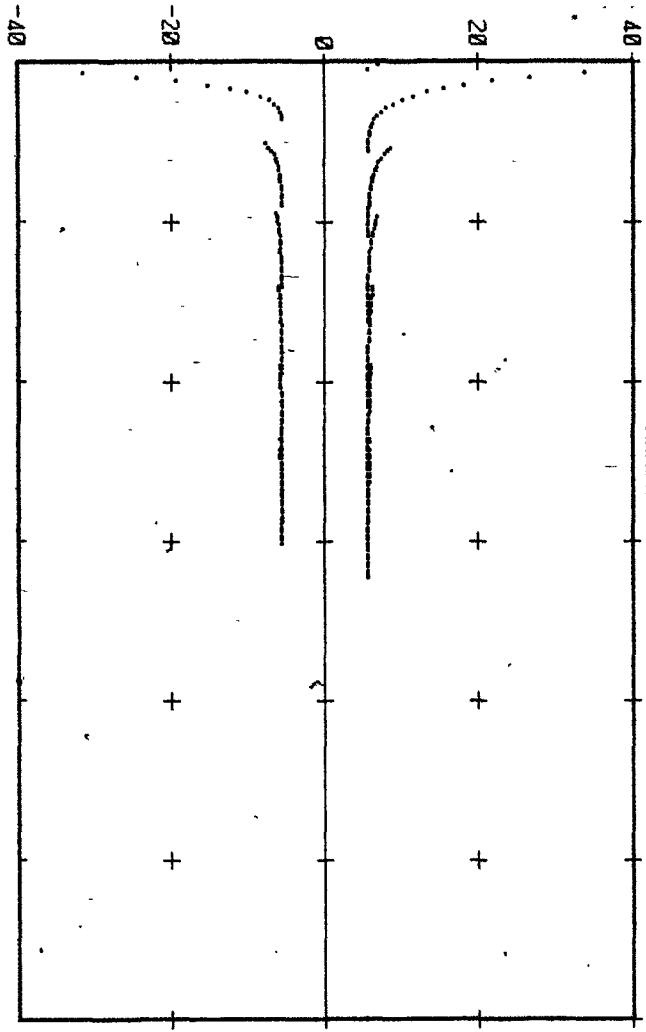


## NOISE (DB)

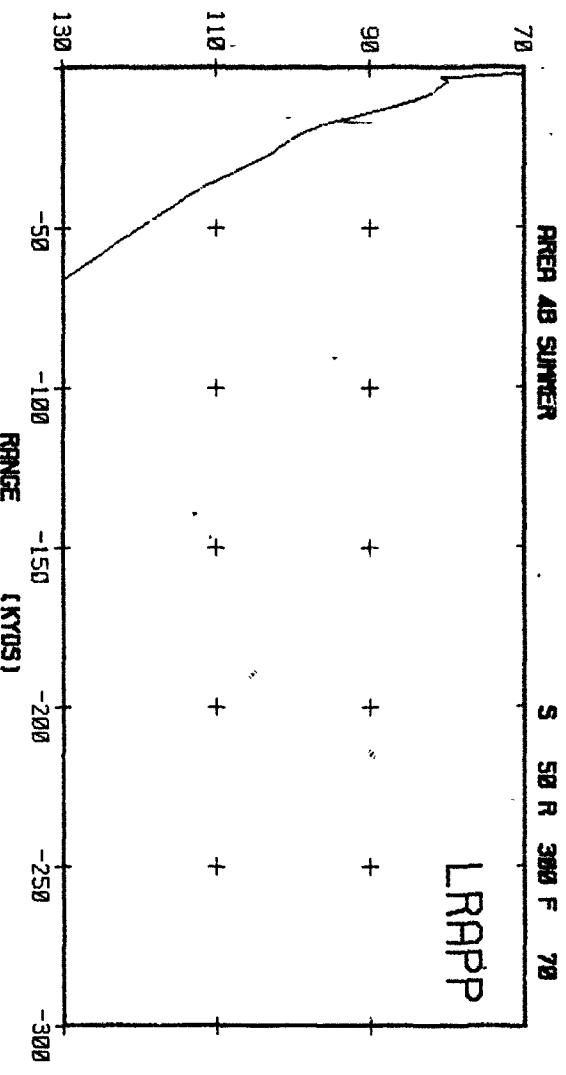


- 55 -

### ARRIVAL ANGLE

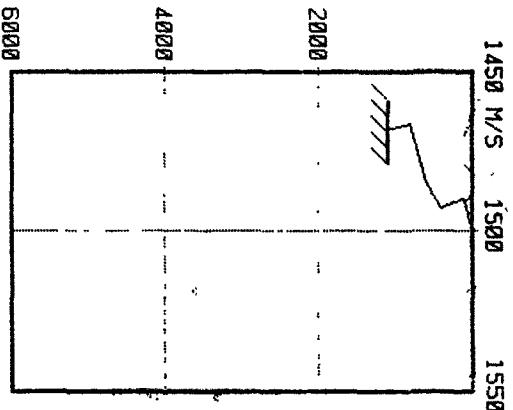


### DB LOSS



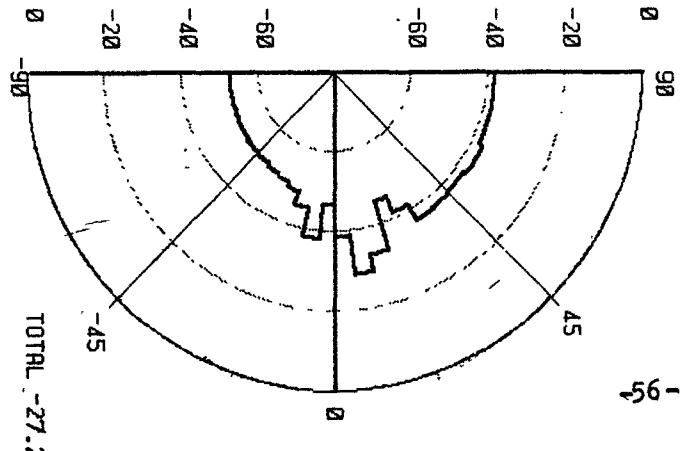
L RAPP

### DEPTH IN METERS



1450 M/S 1500 1550

### NOISE (DB)



-56-

70

PAGER AB SUMMER

'S 268 R 368 F 78

1459 M/S 1500 1559

LRAPP

## DB LOSS

110  
100  
90130  
100  
-100  
-150  
-200  
-250  
-300

RANGE (KILOMETERS)

## DEPTH IN METERS

2000

4000

6000

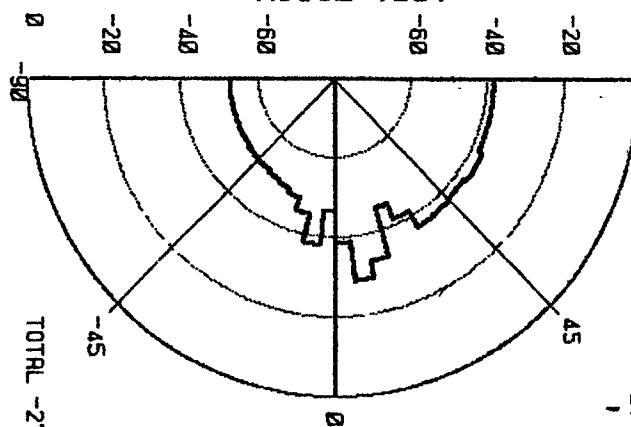
0

- 57 -

## ARRIVAL ANGLE

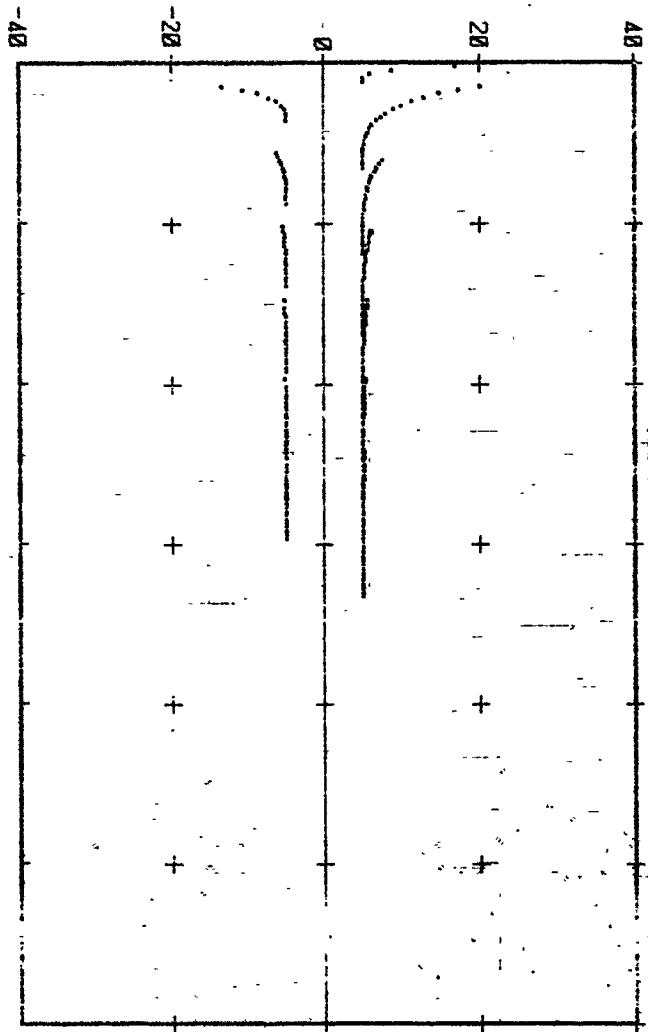
20  
0  
-20  
-40  
-60  
-80  
-100  
-120  
-140  
-160  
-180  
-200  
-220  
-240  
-260  
-280  
-300+  
+  
+  
+  
+  
+  
+  
+  
+  
+  
+

## NOISE (DB)

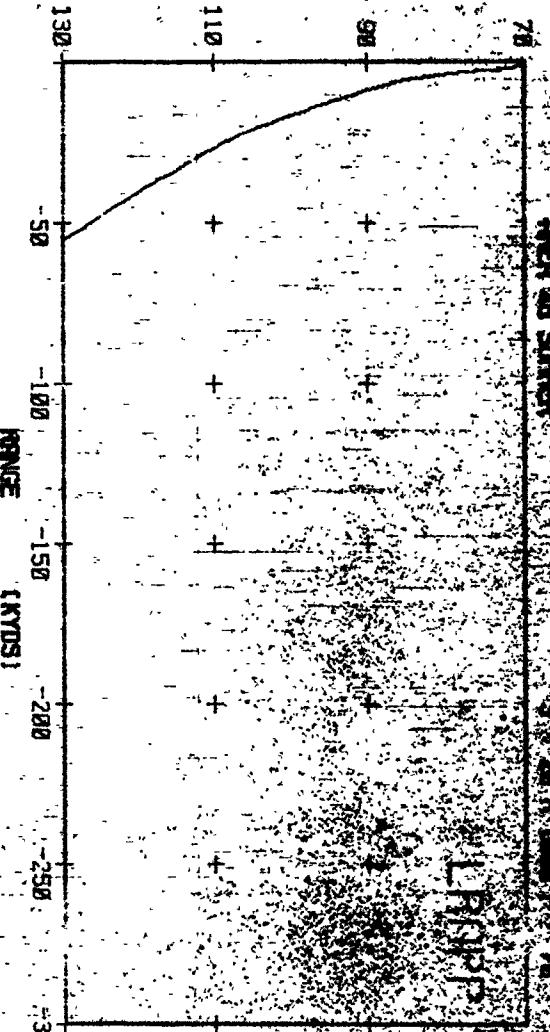


TOTAL -27.2 DB

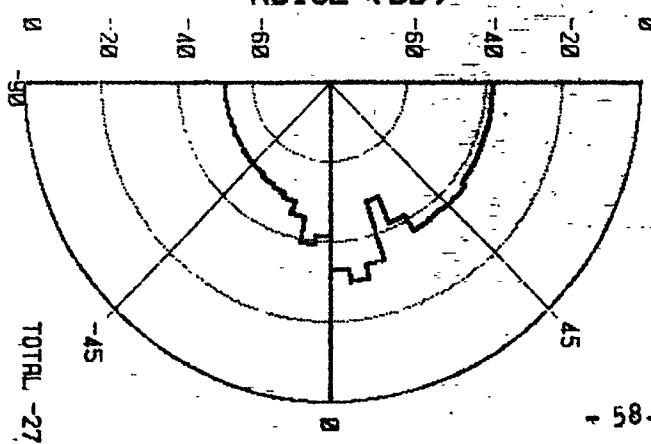
### ARRIVAL ANGLE



### DB LOSS



### NOISE (DB)



### DEPTH IN METERS



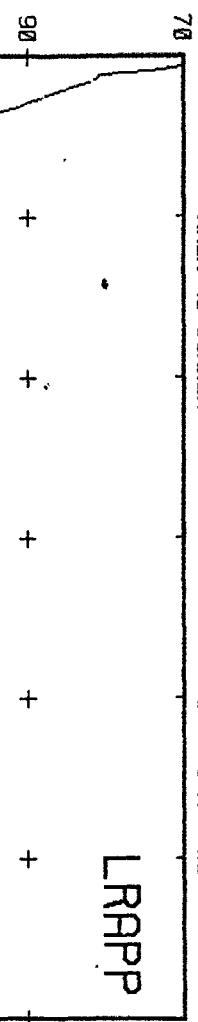
PAPER AB SUMMER

S 50 R 1000 F 70

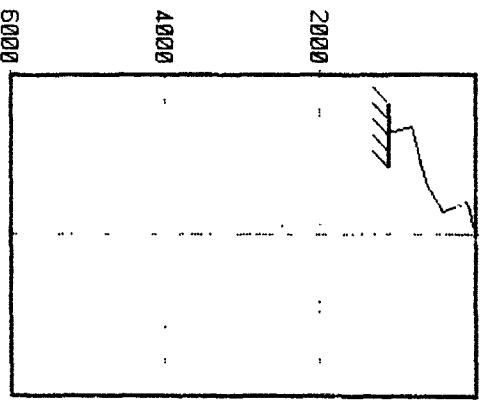
1450 M/S 1500 1550

L RAPP

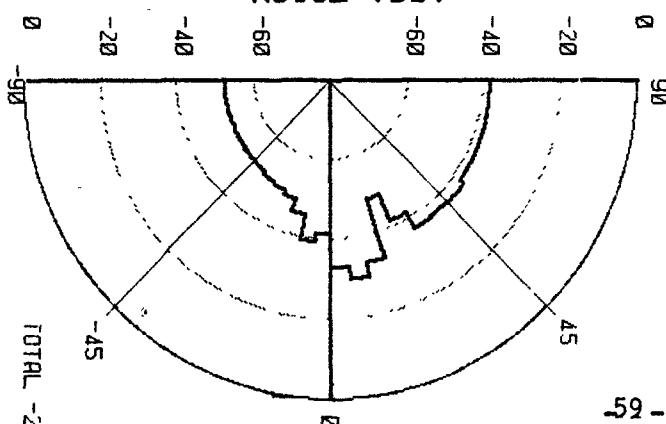
DB LOSS



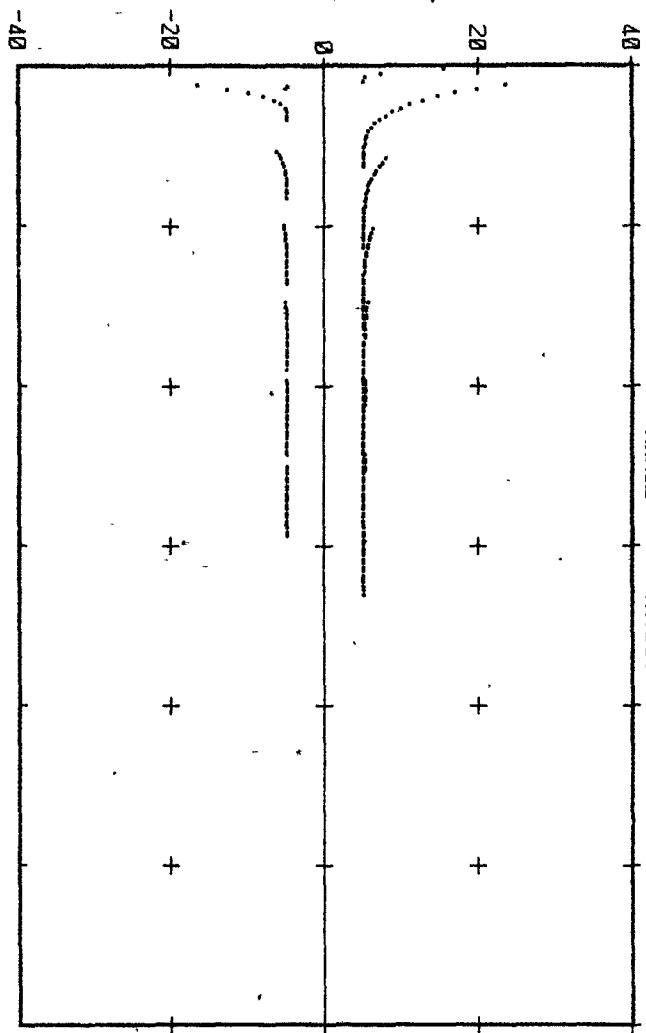
DEPTH IN METERS



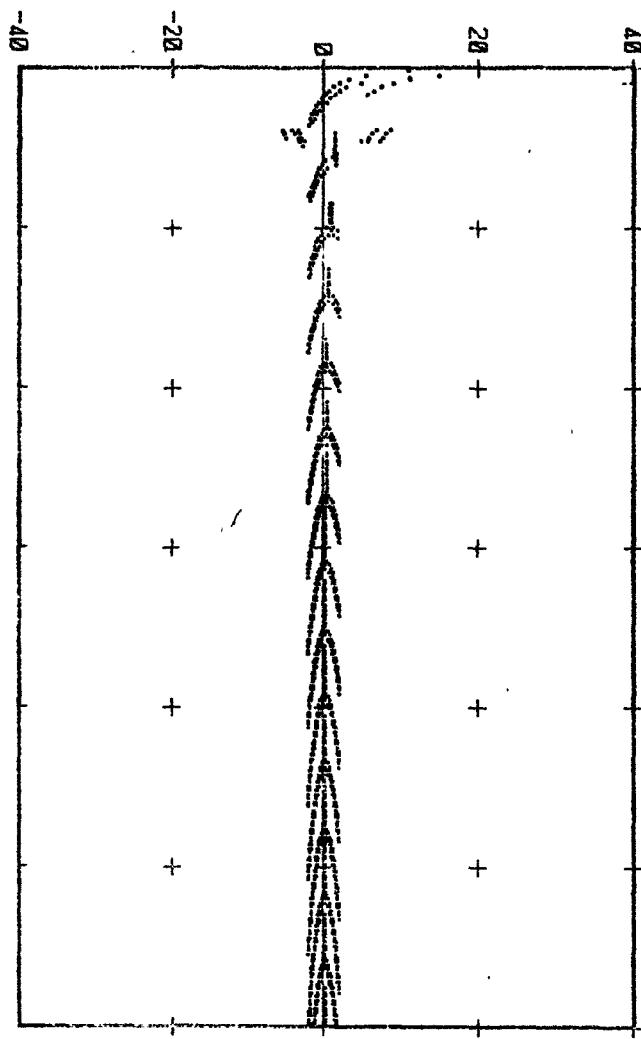
NOISE (DB)



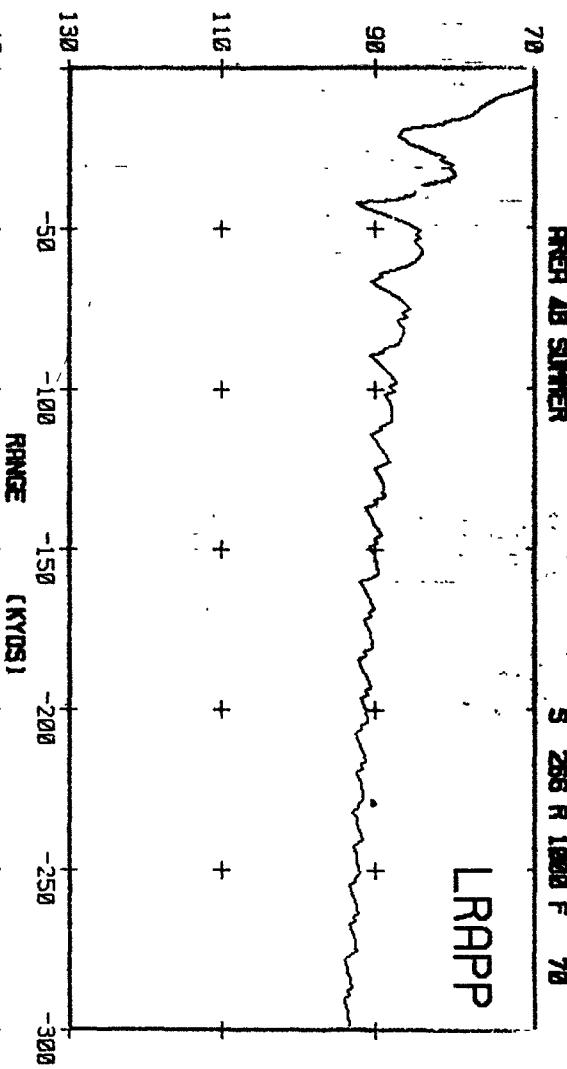
ARRIVAL ANGLE



### ARRIVAL ANGLE



### DB LOSS



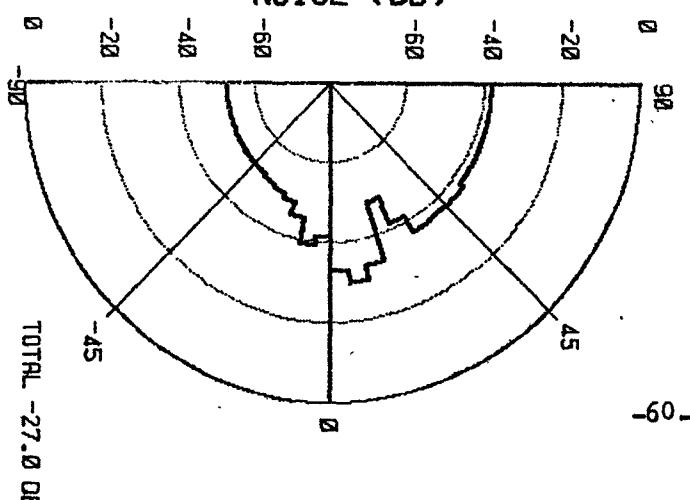
RER 4B SUMMER

S 266 R 1800 F 70

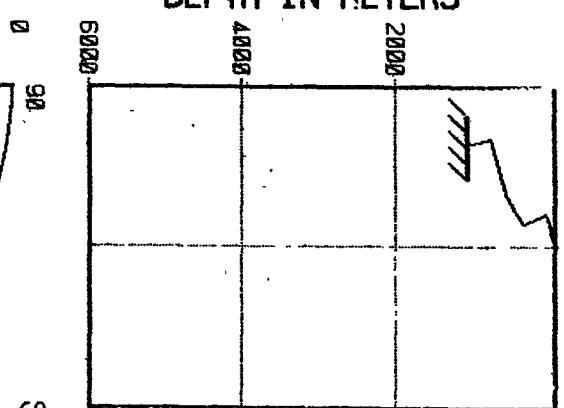
LRAPP

1450 M/S 1500 1550

### NOISE (DB)



### DEPTH IN METERS



AREA 48 SUMMER

S 28 R 1312 F 76

1450 M/S 1500 1550

L (dB)

D3 LOSS

90  
110  
+ + + + + + + + + +

130  
-50  
-100  
-150  
-200  
-250  
-300

RANGE (KMS)

DEPTH IN METERS

2000

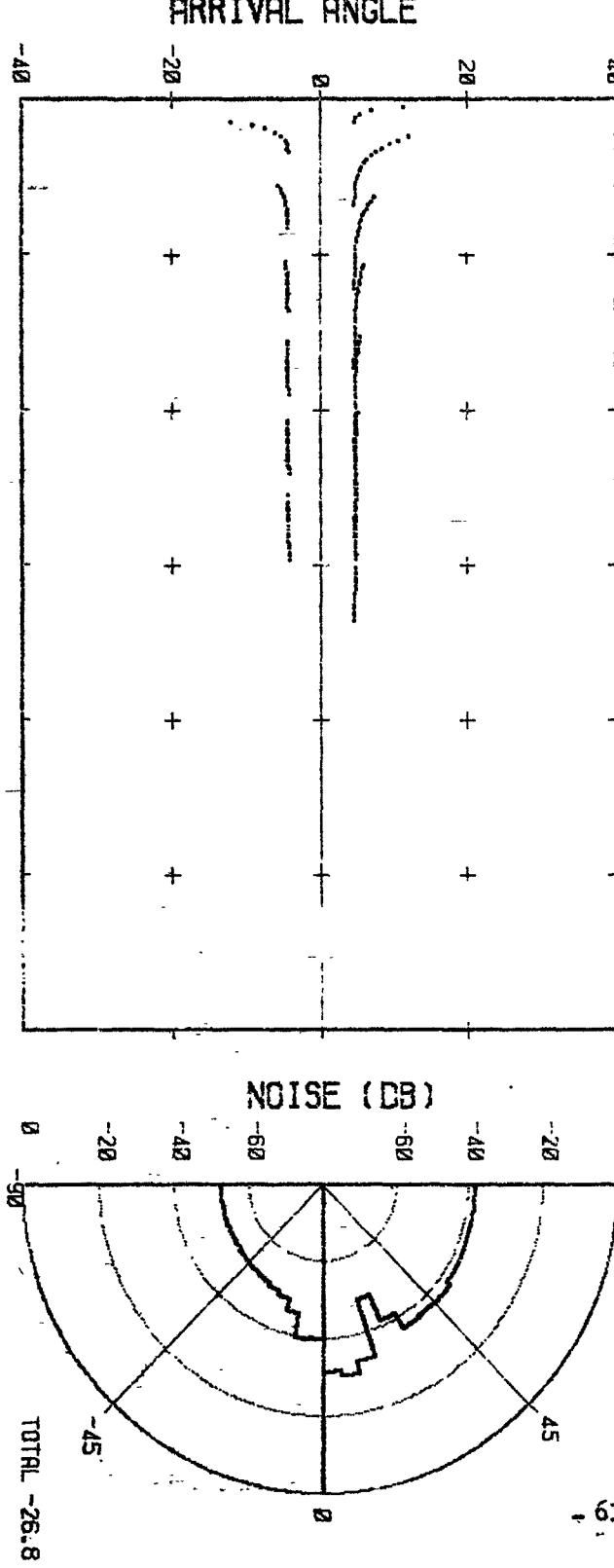
4000

8000

90

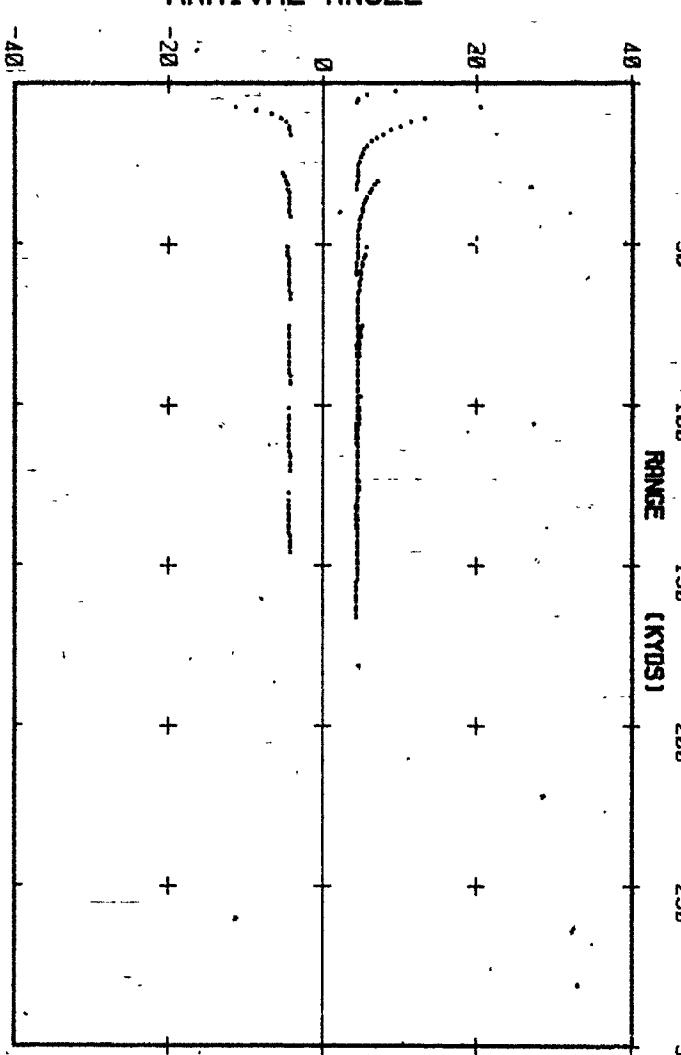
-61 -

NOISE (dB)

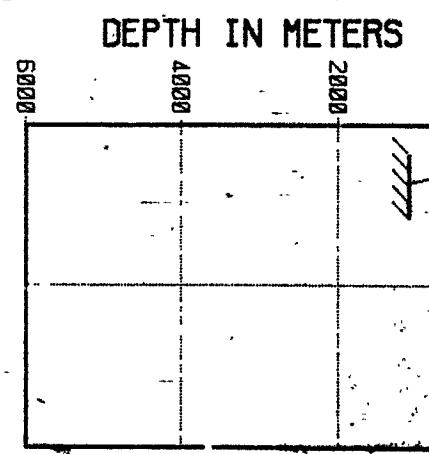


RER 4B SUMMER S 59 R 1312 F 78 1450 M/S 1580. 1550

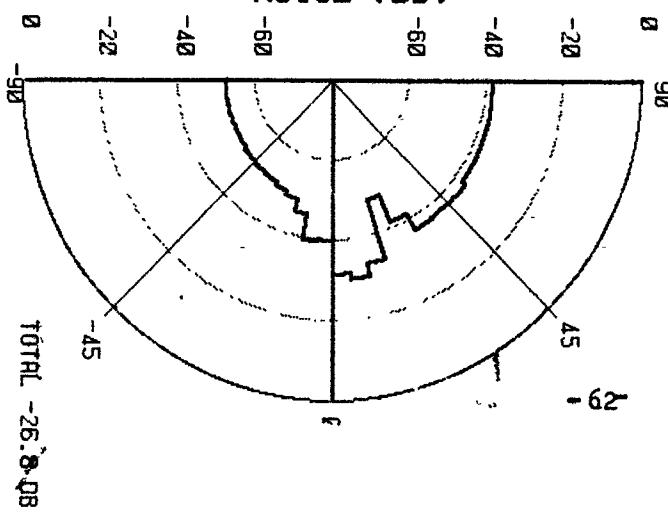
ARRIVAL ANGLE



LRAPP



NOISE (DB)

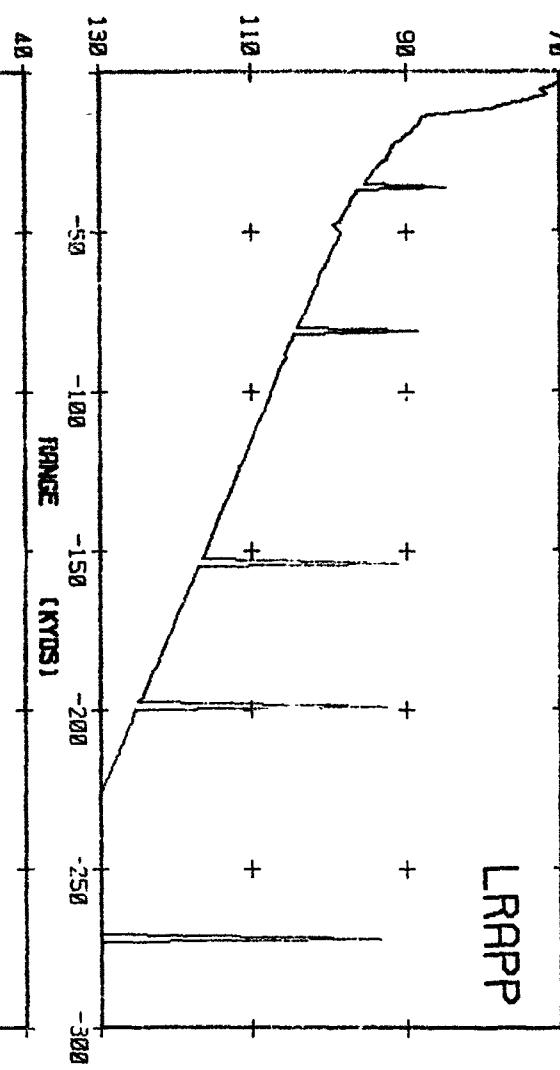


FRIET 48 SUMMER

S 268 R 1312 F 70

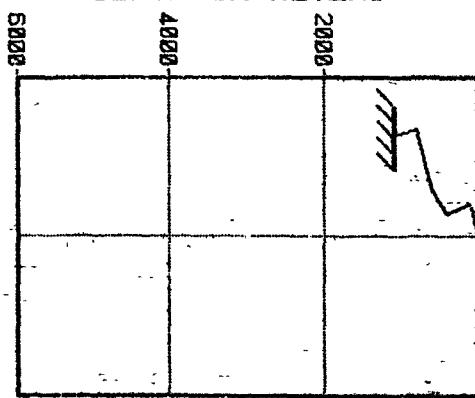
1450 M/S 1500 1550

DB LOSS

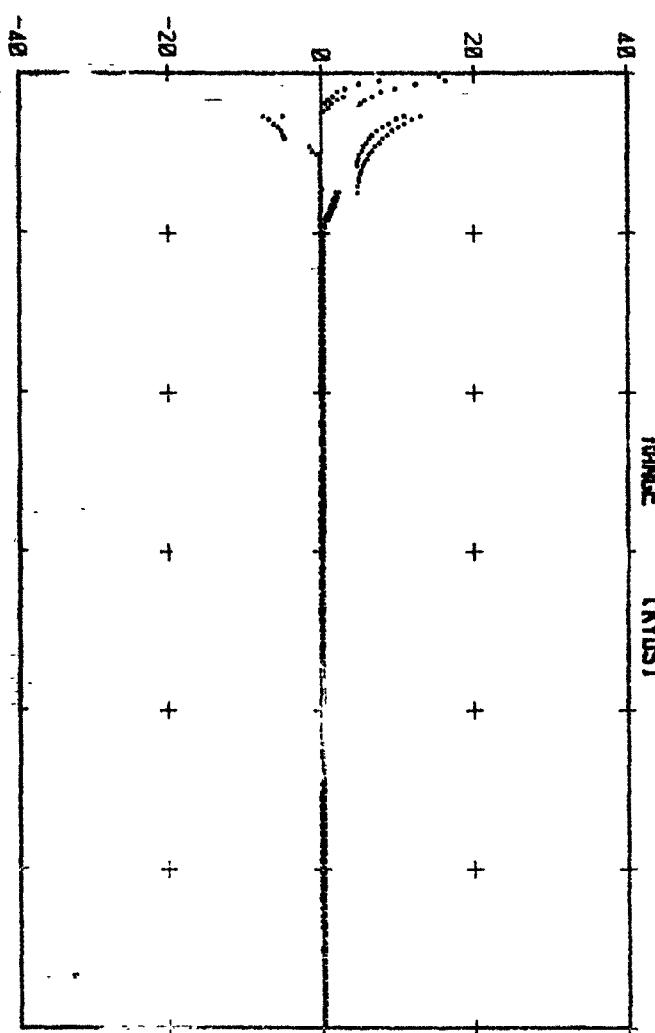


LRAPP

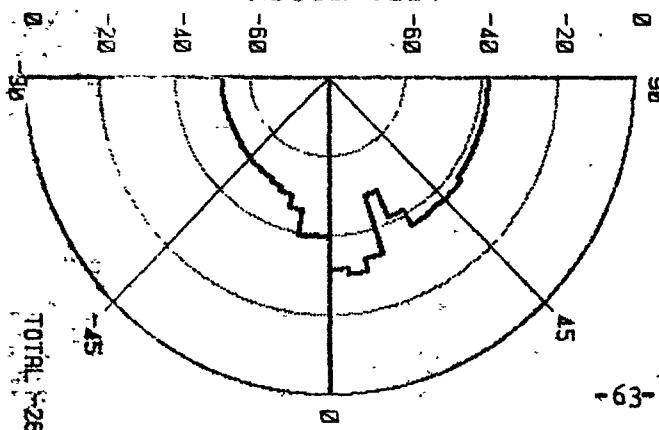
DEPTH IN METERS



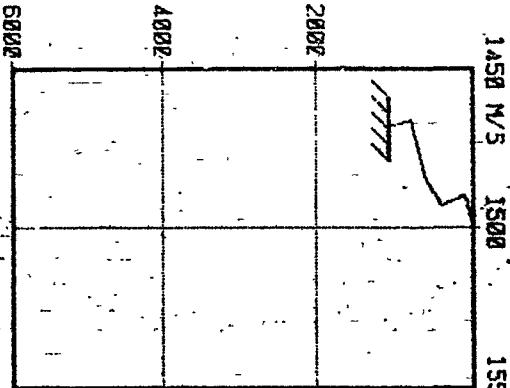
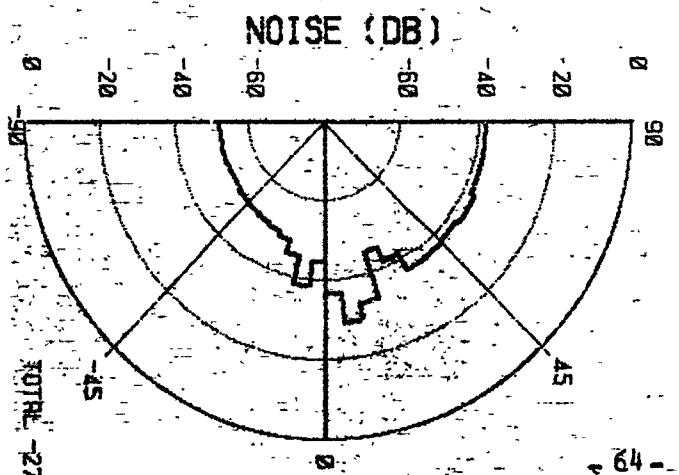
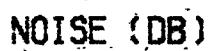
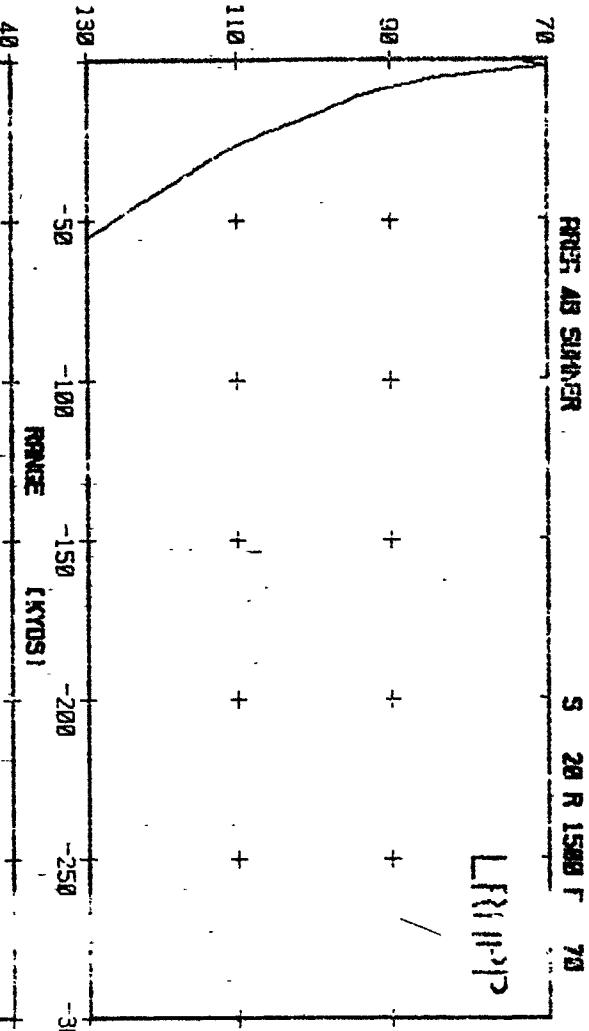
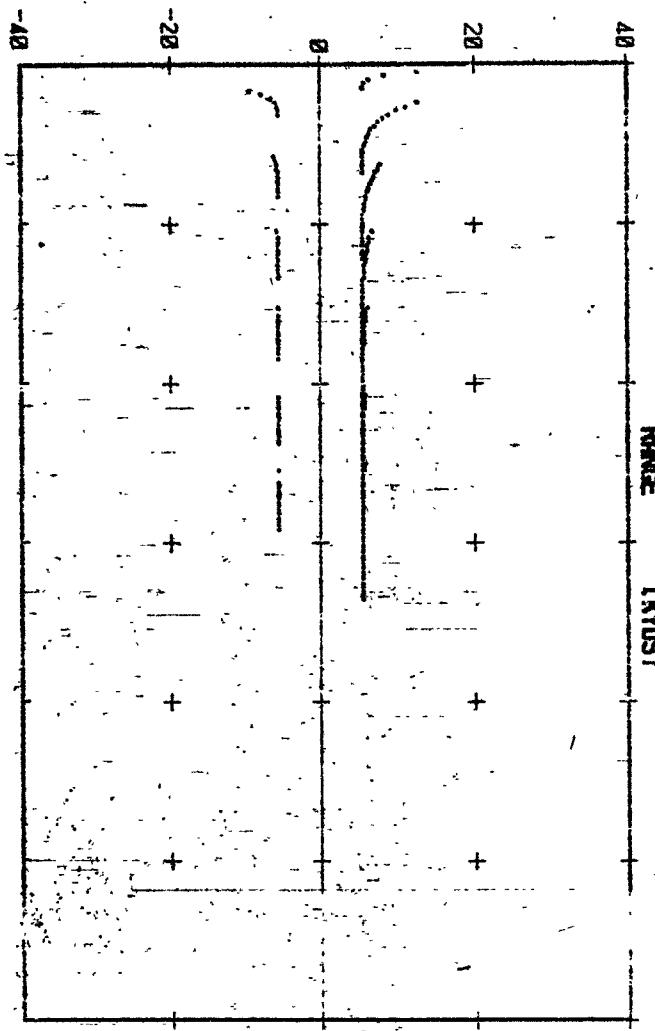
ARRIVAL ANGLE



NOISE (DB)



TOTAL: 26.8 DB



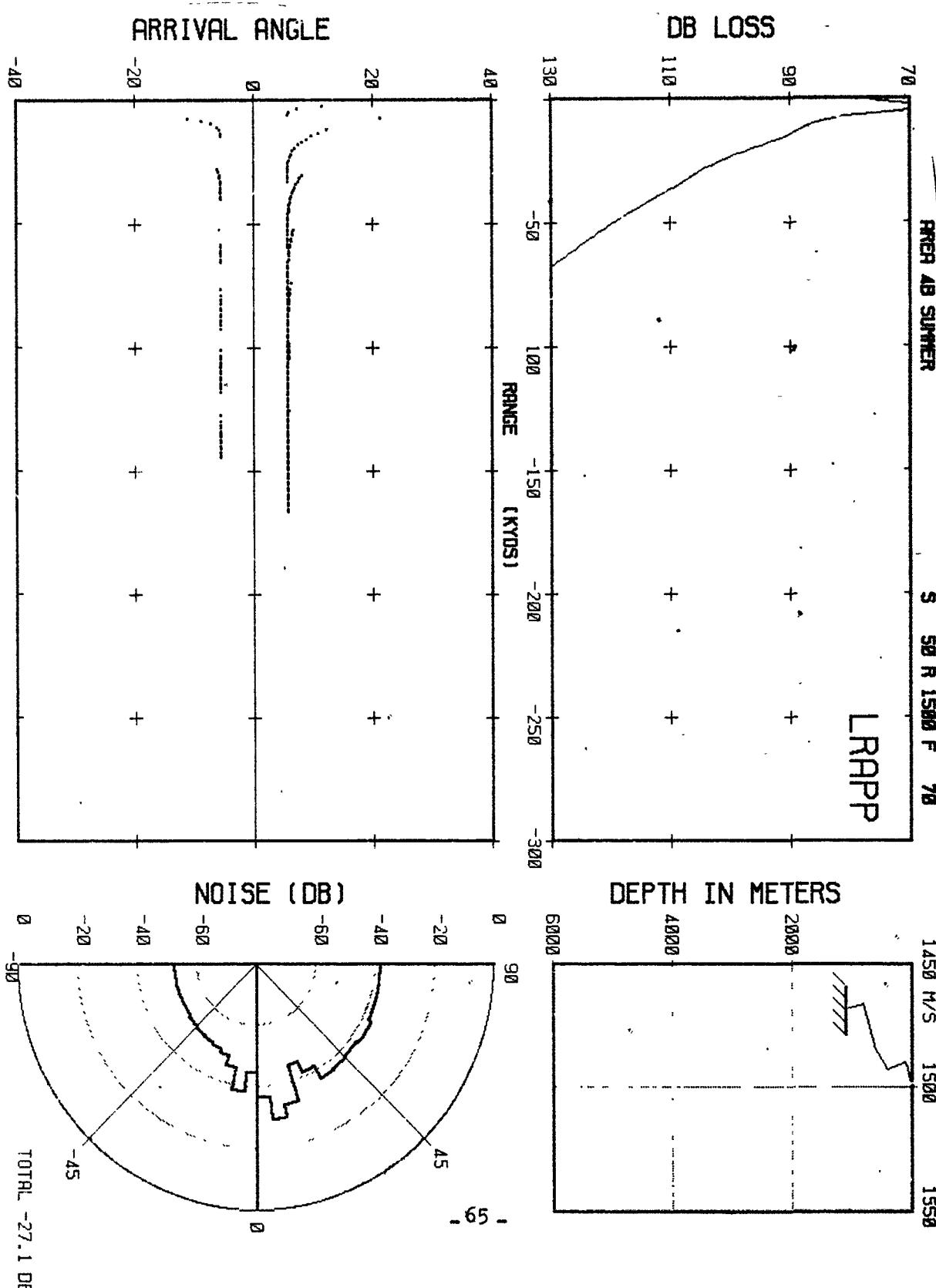
TOTRE -27.1 DB

41

PAPER AB SUMMER

5 50 R 1500 F

1450 M/S 1500 1550



FREQ 49 SUMMER

S 286 R 15M F 78

1450 M/S 1500 1550

LRFAPP

78

DB LOSS

130  
110  
90

-50 -100 -150 -200 -250 -300

RANGE (KNOTS)

0

90

180

270

360

DEPTH IN METERS

5000  
4000  
3000  
2000  
1000

ARRIVAL ANGLE

20  
0  
-20

+

+

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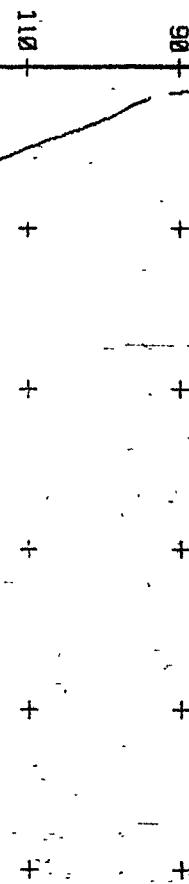
78

AREA 4B SUMMER

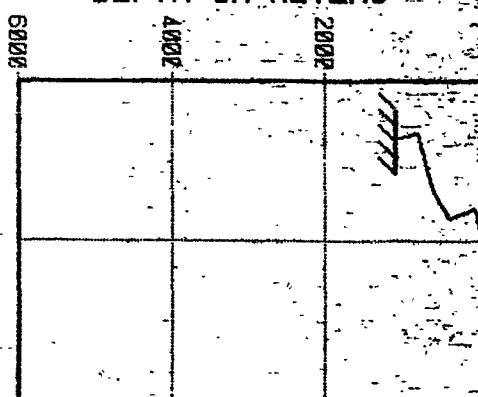
S 28 R 2625 F 78

LRNPP

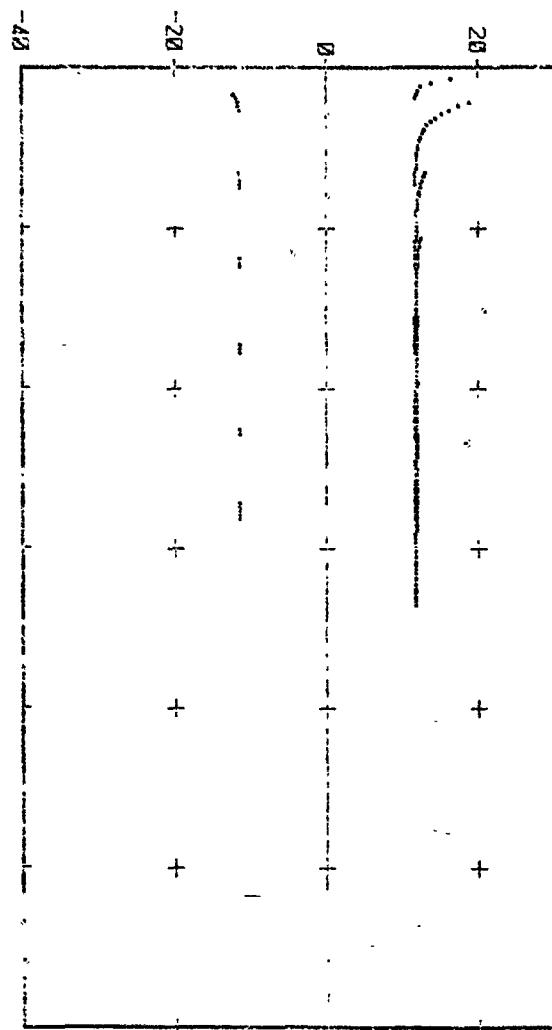
## DB LOSS



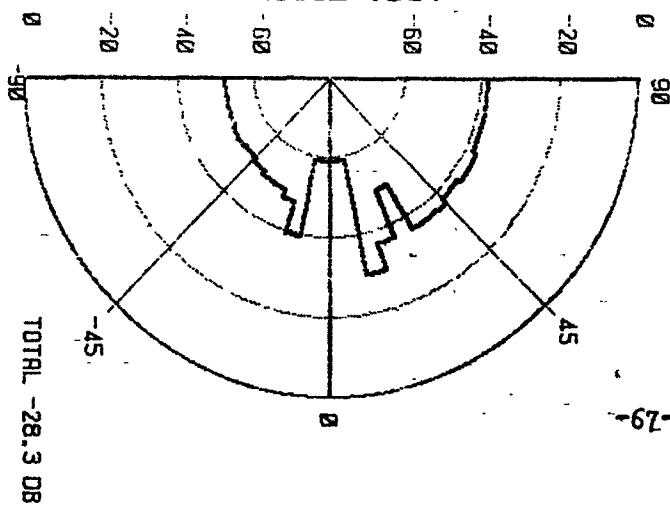
## DEPTH IN METERS



## ARRIVAL ANGLE



## NOISE (DB)



DB LOSS

70

FRR 4B SUMMER

S 50 R 2625 F 78

1450 M/S 1500 1550

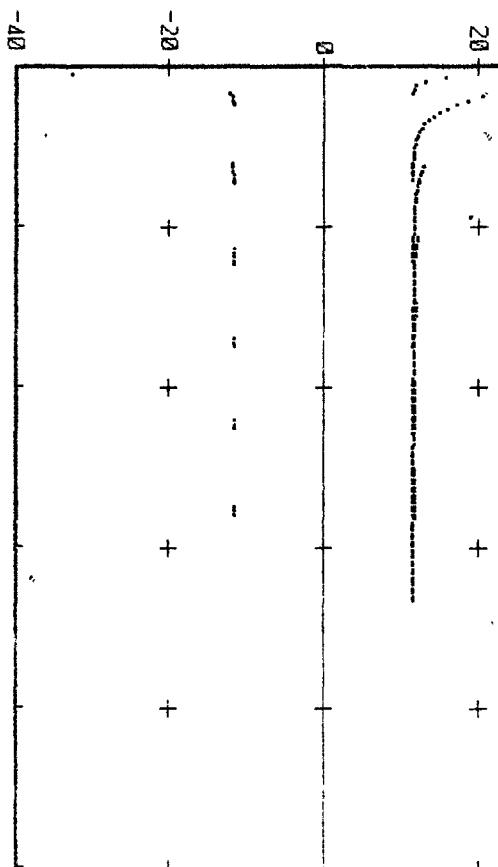
LRAPP

130  
110  
90  
70  
50  
30  
10  
0

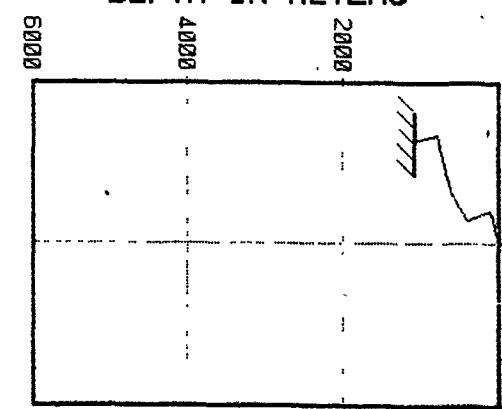
-100 -150 -200 -250 -300

RANGE (KIOS)

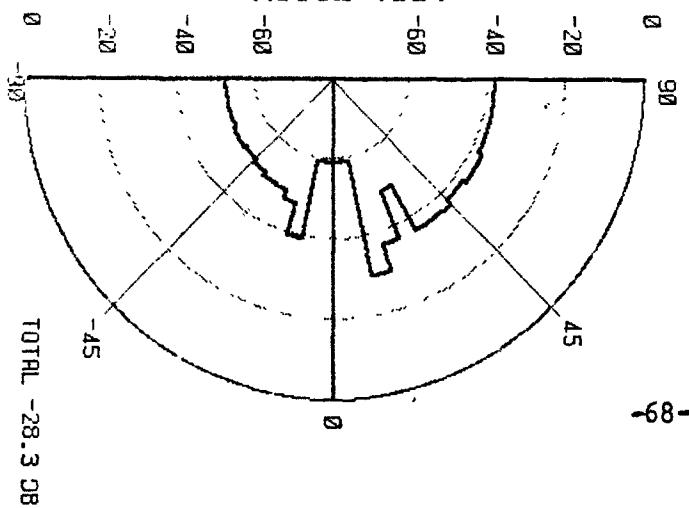
ARRIVAL ANGLE



DEPTH IN METERS



NOISE (DB)



78

ARER AB SUMMER

S 286 R 2625 F 78

1450 M/S 1500 1550

LRAPP

DB LOSS

90

110

130

150

170

190

210

230

250

270

290

310

330

350

370

390

410

430

450

470

490

510

530

550

570

590

610

630

650

670

690

710

730

750

770

790

810

830

850

870

890

910

930

950

970

990

1010

1030

1050

1070

1090

1110

1130

1150

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1290

1310

1330

1350

1370

1390

1410

1430

1450

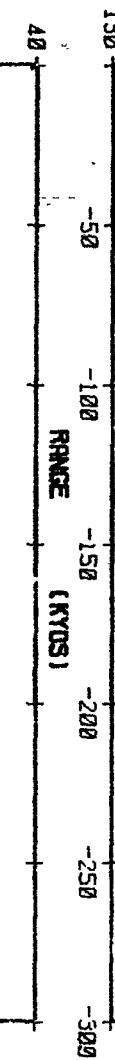
1470

1490

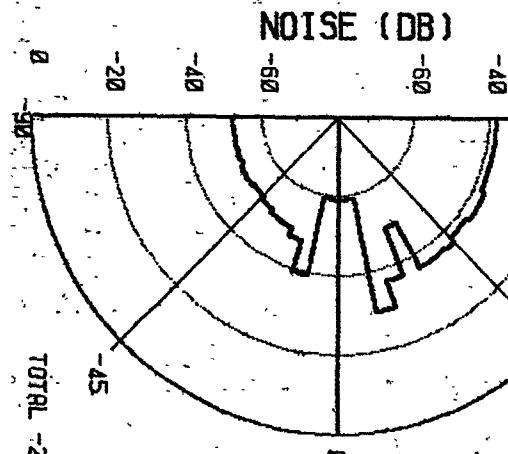
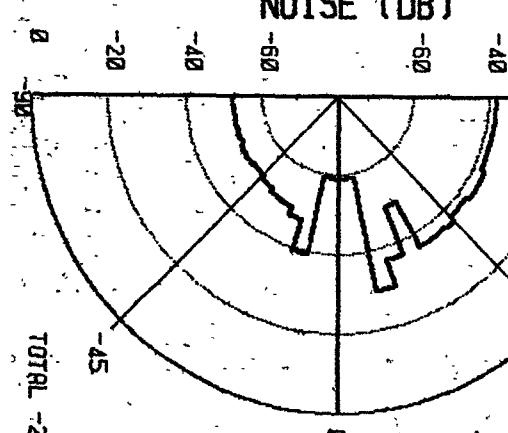
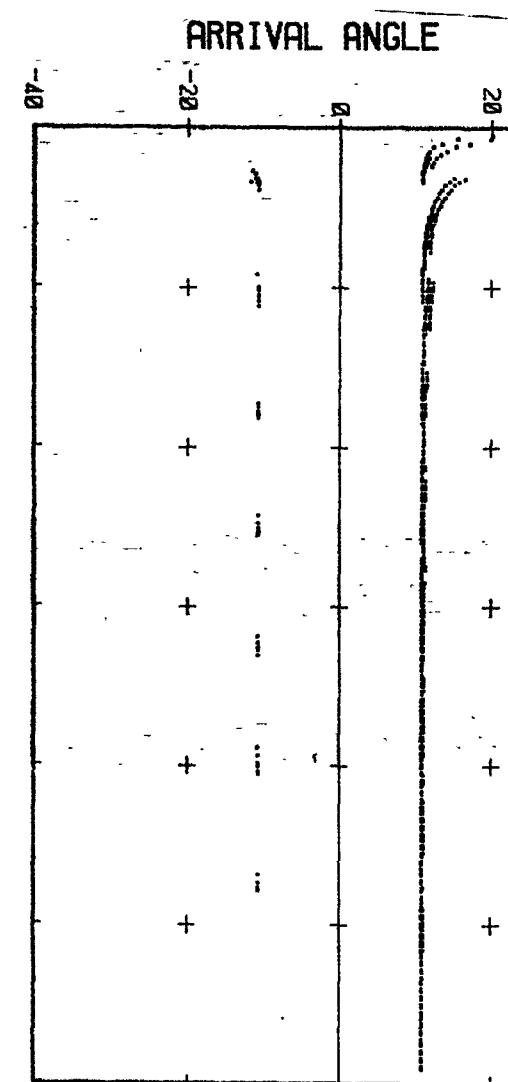
1510

1530

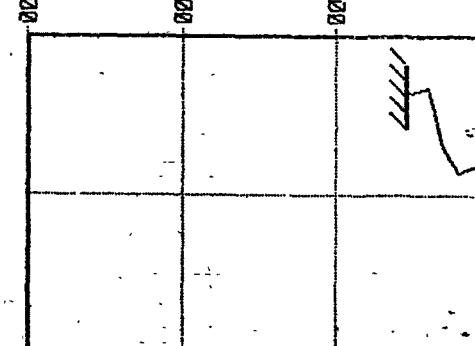
1550



DEPTH IN METERS

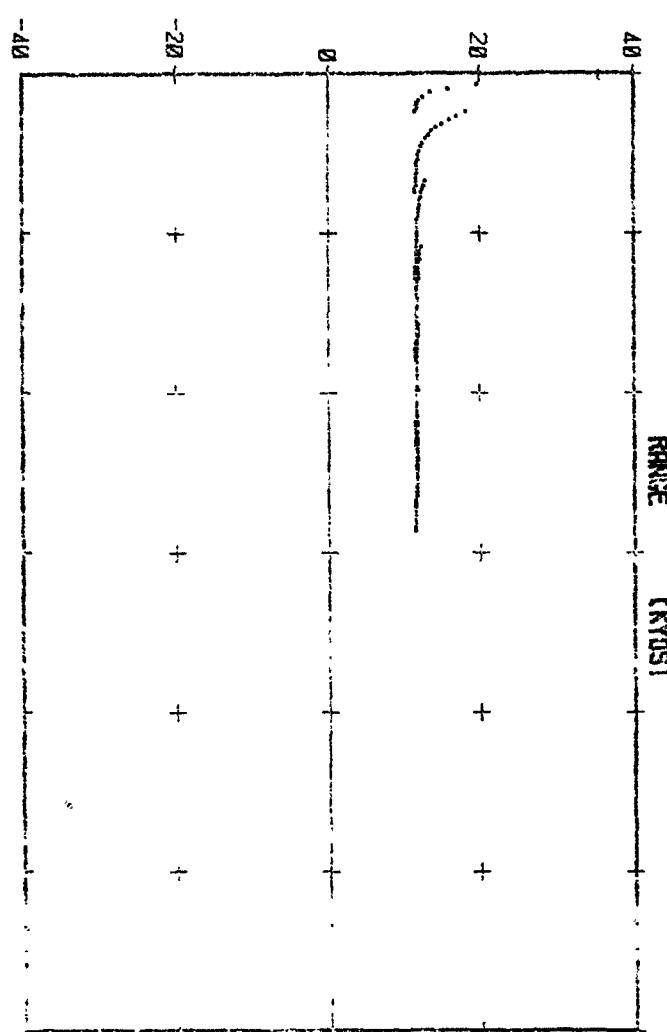


TOTAL -28.3 dB

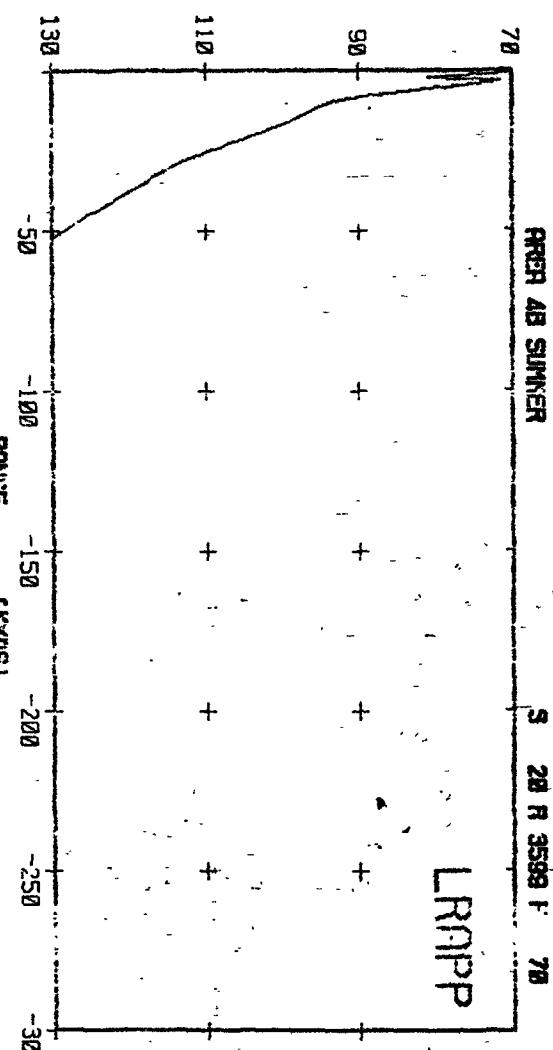


-69-

ARRIVAL ANGLE

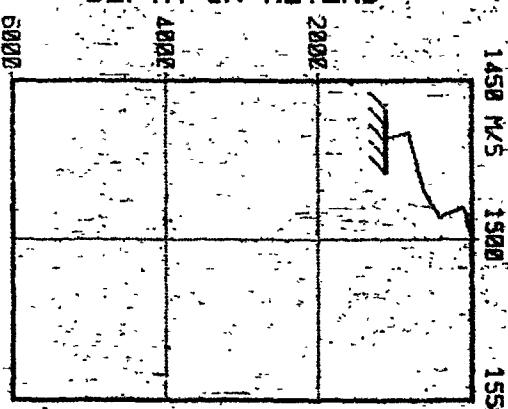


DB LOSS



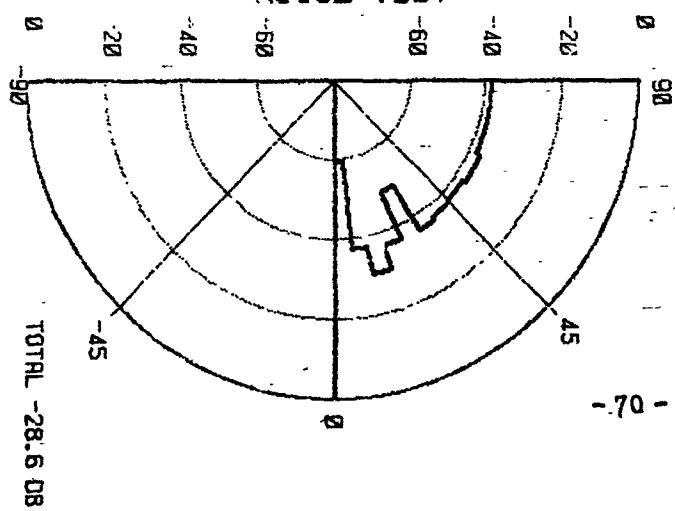
LRAPP

DEPTH IN METERS



1450 Hz 1500 Hz 1550 Hz

NOISE (DB)



-70 -

70

HIER 4B SUMMER

S

50 R

3588 F

70

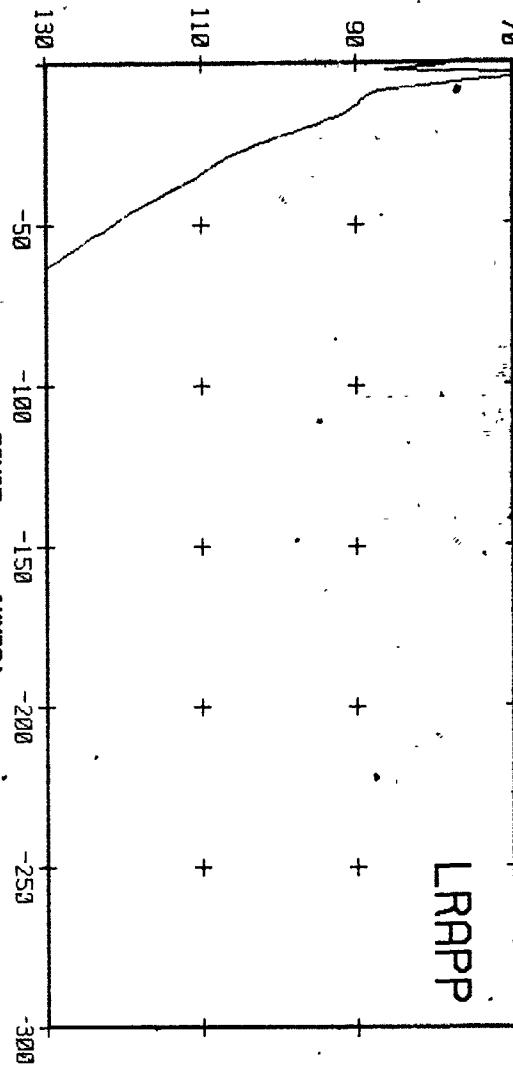
1450 M/S

1500

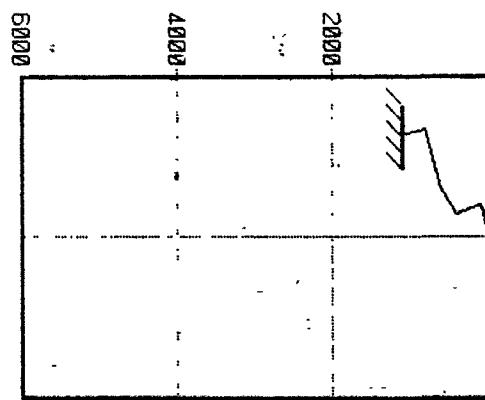
1550

LRAPP

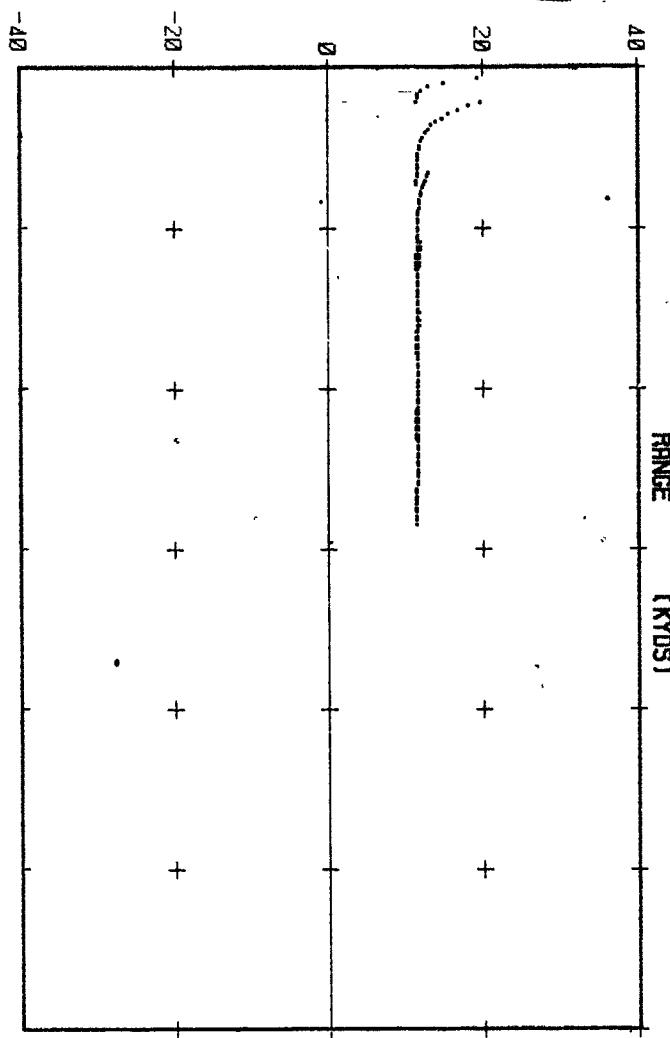
DB LOSS



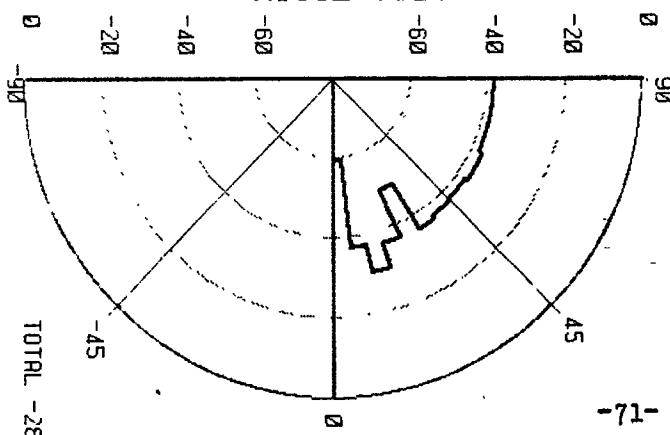
DEPTH IN METERS



ARRIVAL ANGLE



NOISE (DB)



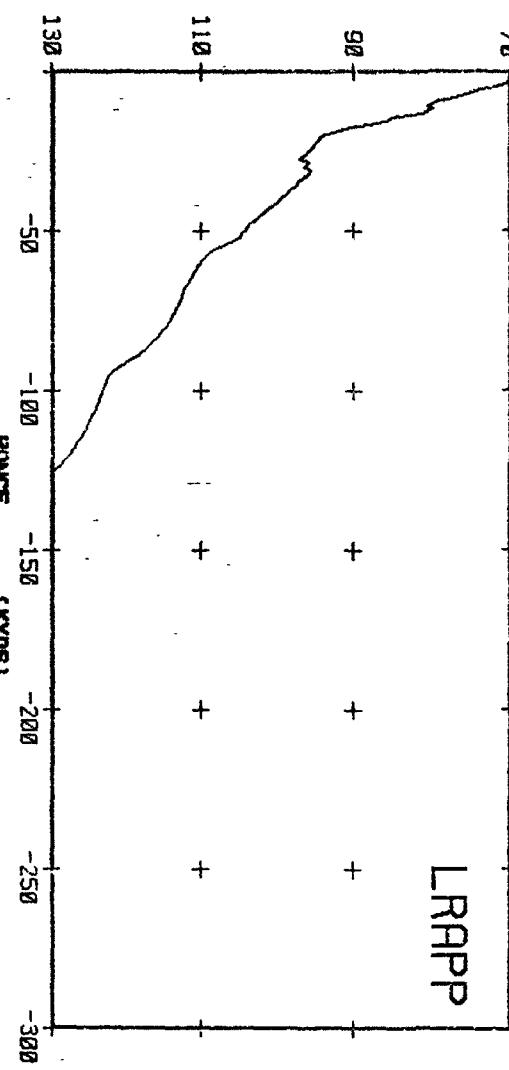
70

AKER AB SUMMER

S 268 R 3599 F 70

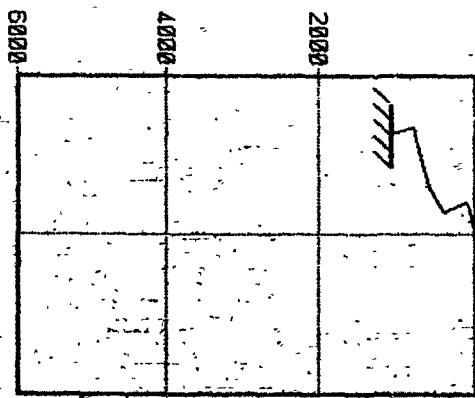
1450 M/S 1500 1550

## DB LOSS

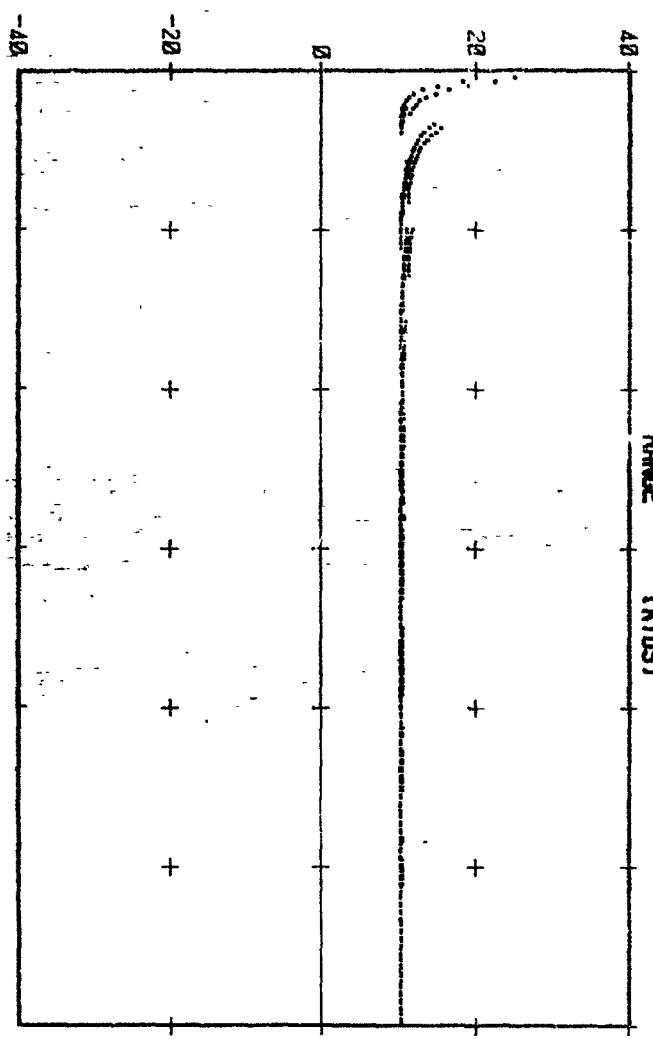


## LRAPP

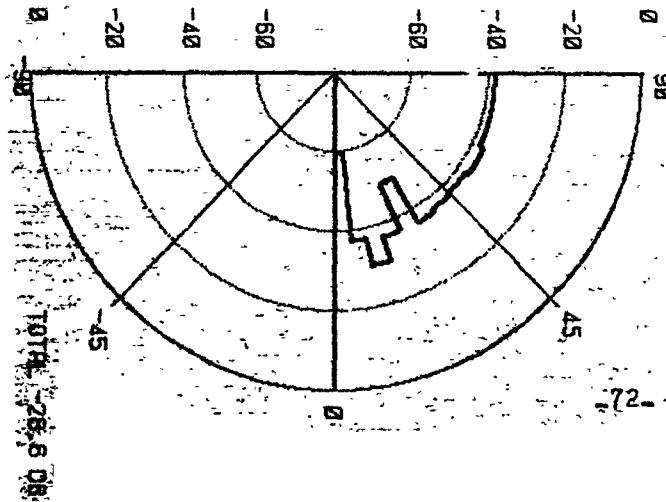
## DEPTH IN METERS



## ARRIVAL ANGLE



## NOISE (DB)



72-

TOTAL -26.8 DB

-4A

78

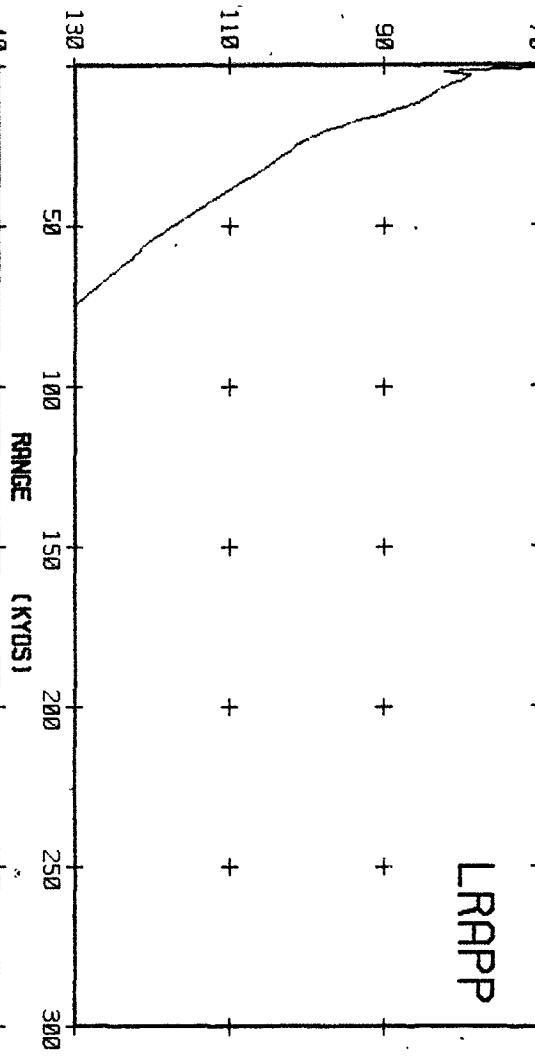
AREA AB SUMMER

S 20 R 62 F 150

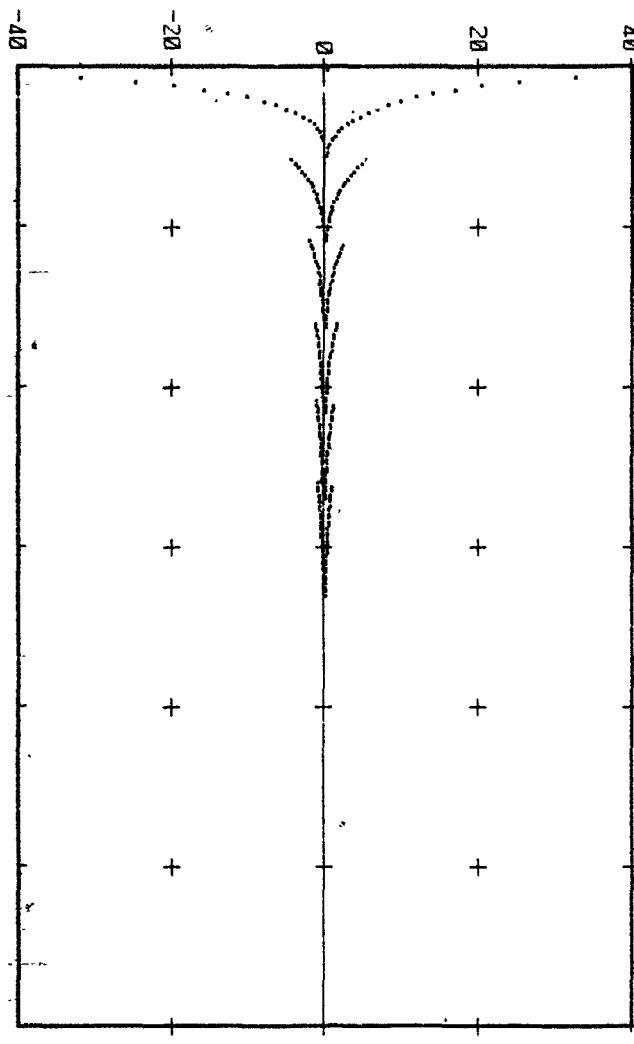
LRAPP

1450 M/S 1500 1550

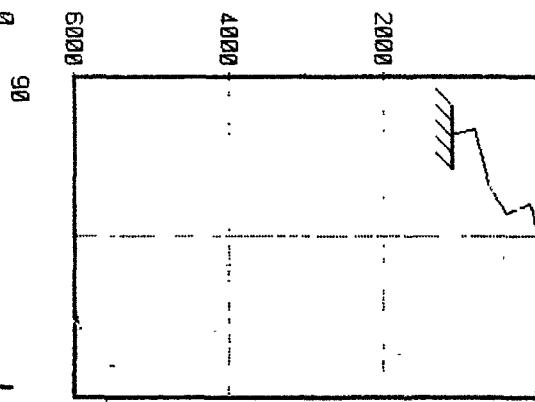
## DB LOSS



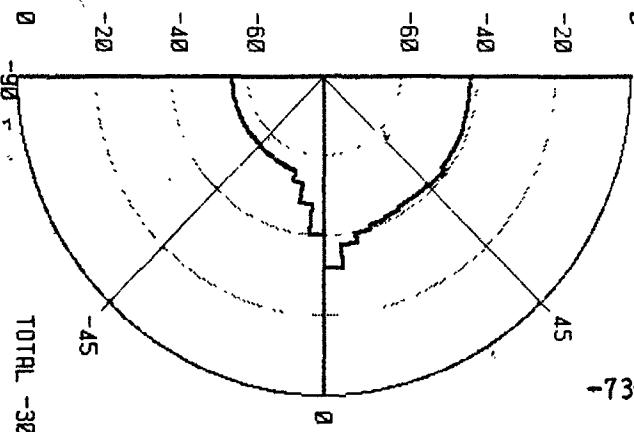
## ARRIVAL ANGLE



## DEPTH IN METERS



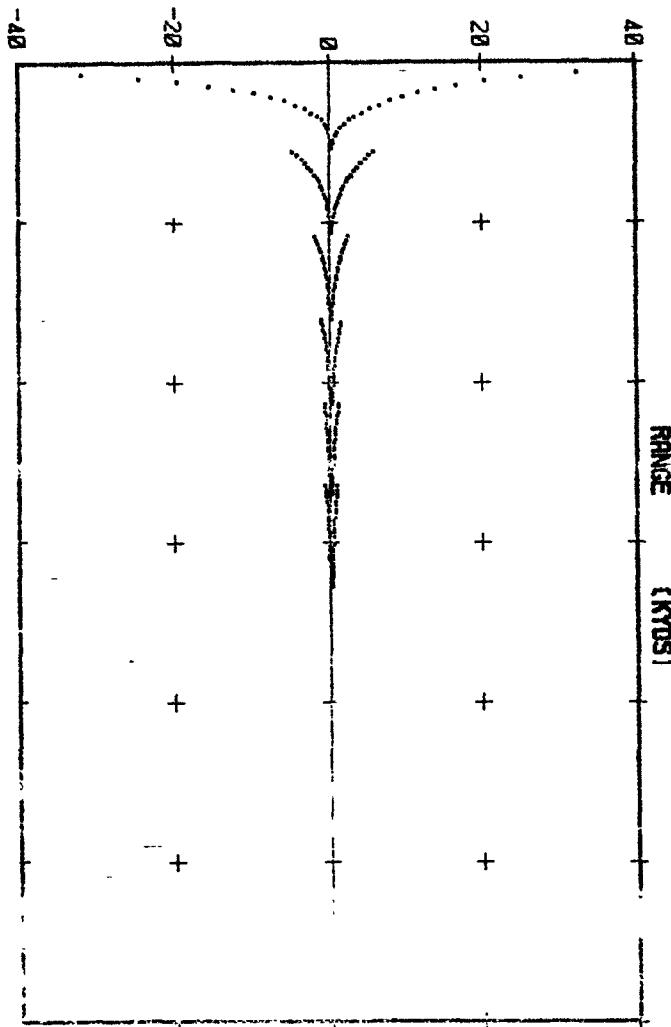
## NOISE (DB)



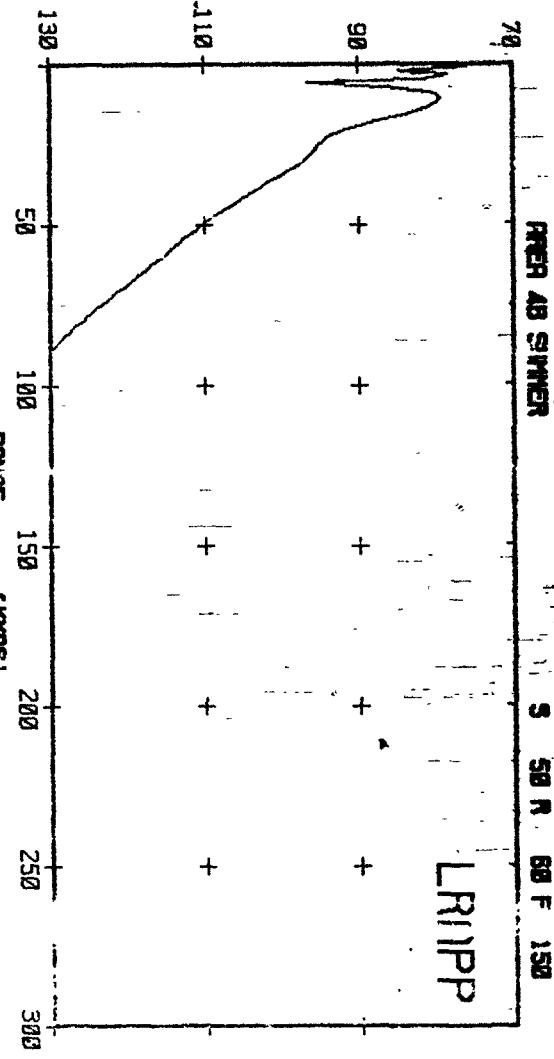
TOTAL -30.2 DB

-73-

### ARRIVAL ANGLE



### DB LOSS



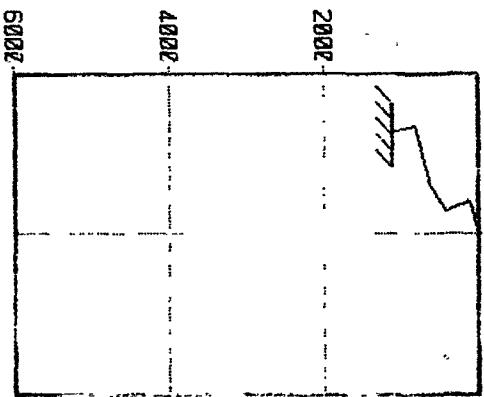
FREQUENCIES

S 50 R 60 F 150

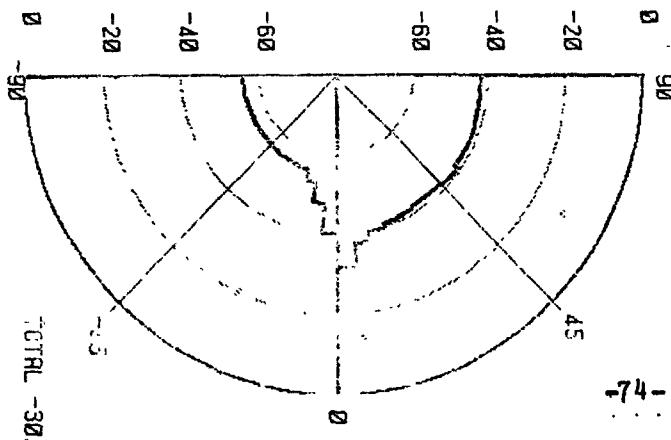
1450 M/S 1500 1500

L RIPPLE

### DEPTH IN METERS



### NOISE (DB)



-74-

TOTAL -30.2 DB

70

ARR AB SUMMER

S 268 R 60 F 150

1450 M/S 1520 1550

LHMPP

## DB LOSS

130  
110  
900  
2000  
4000

DEPTH IN METERS

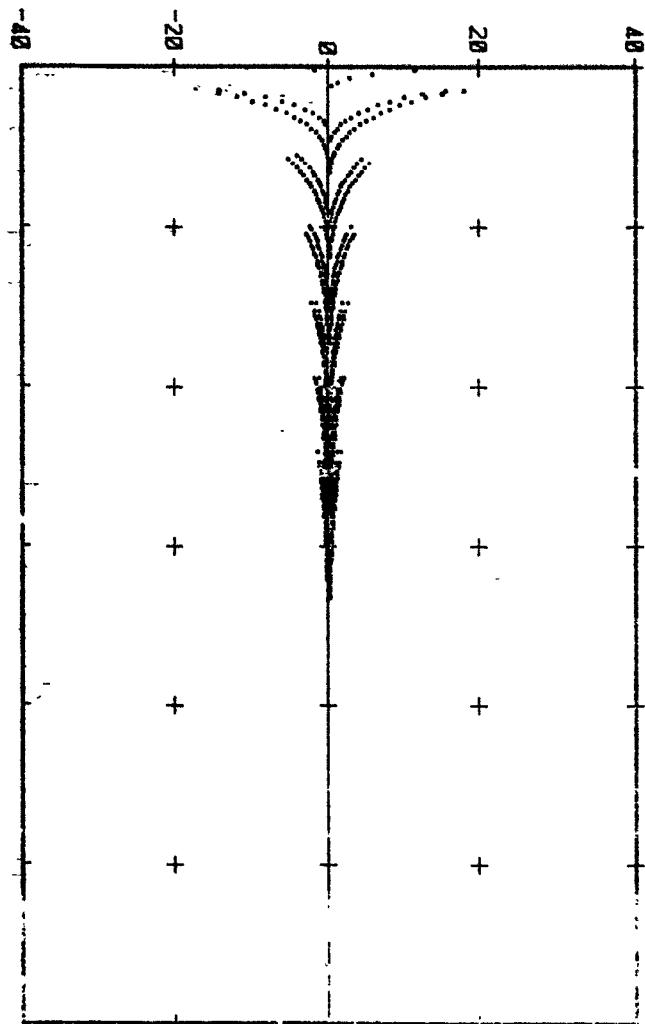
0

90

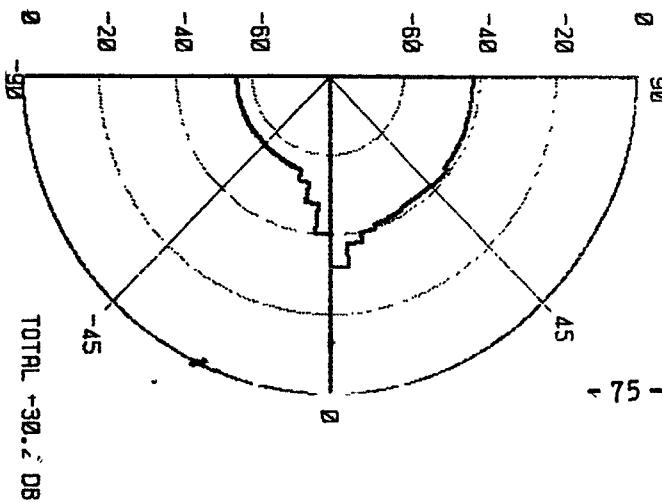
6000

75 -

## ARRIVAL ANGLE



## NOISE (DB)



TOTAL +30.~ DB

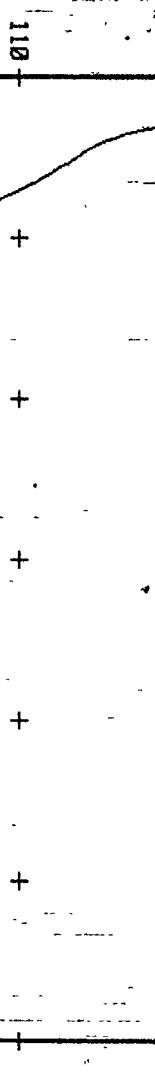
PRES AB SINTER

1450 1500 1550

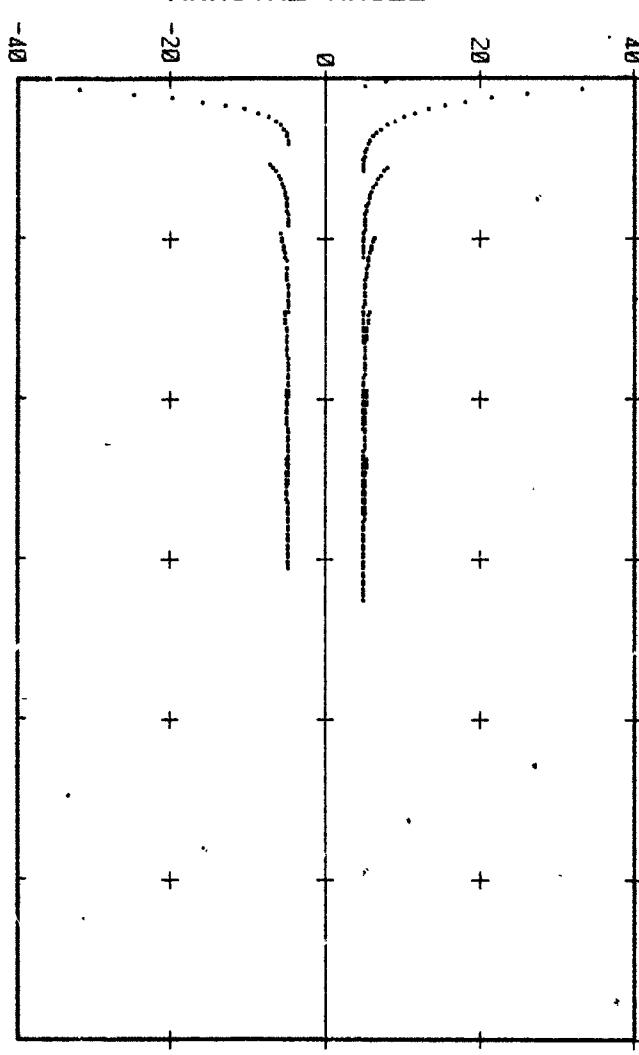
1450 1500 1550

LRAPP

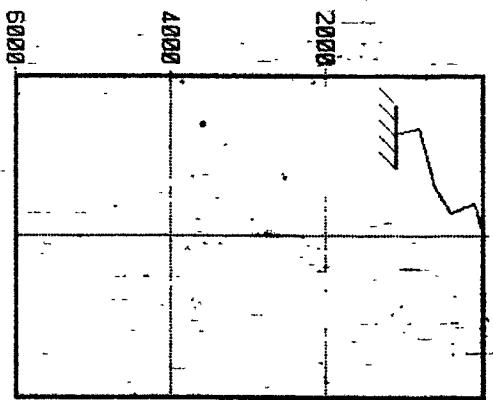
DB LOSS



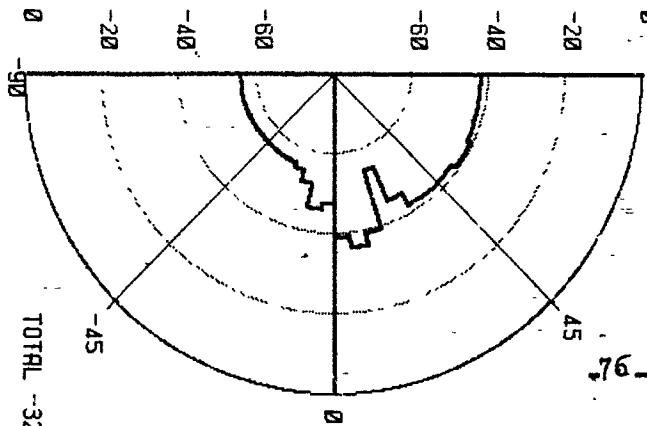
ARRIVAL ANGLE



DEPTH IN METERS



NOISE (DB)



TOTAL -32.6 DB

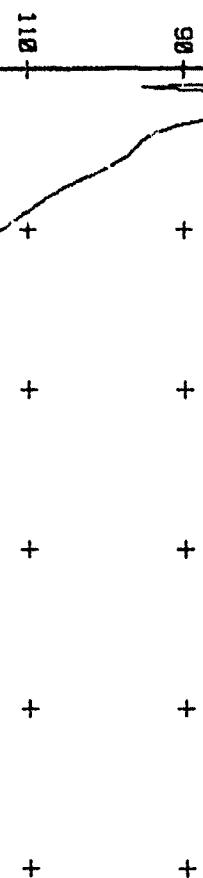
PRIER AB SUMMER

S 50 R 168 F 150

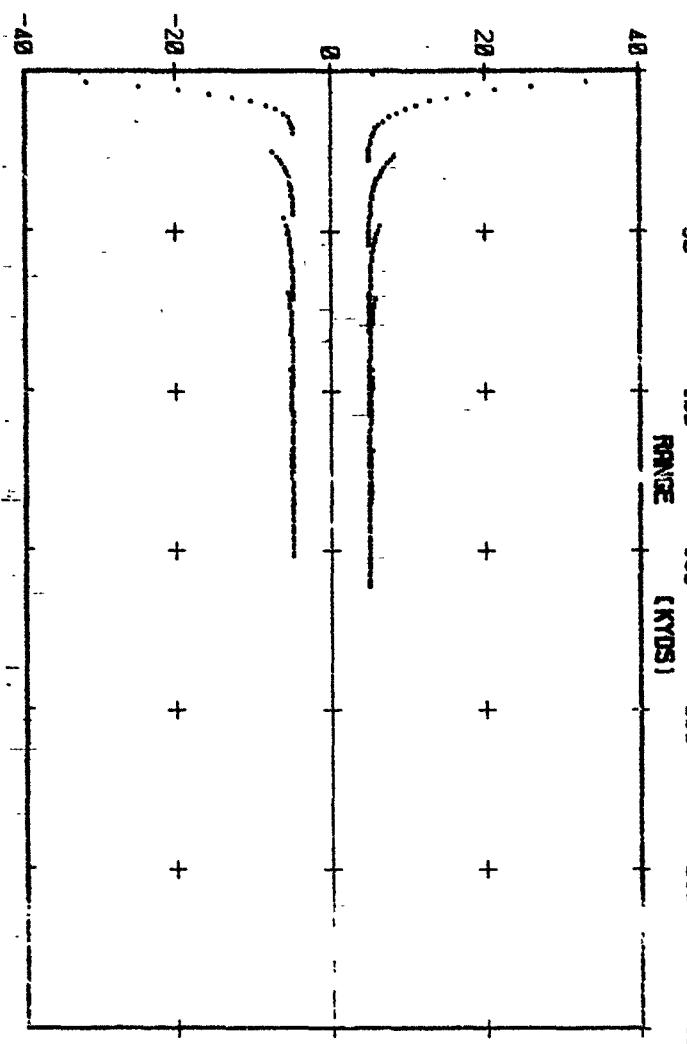
1450 M/S 150 1.2

LRAPP

DB LOSS



ARRIVAL ANGLE



DEPTH IN METERS

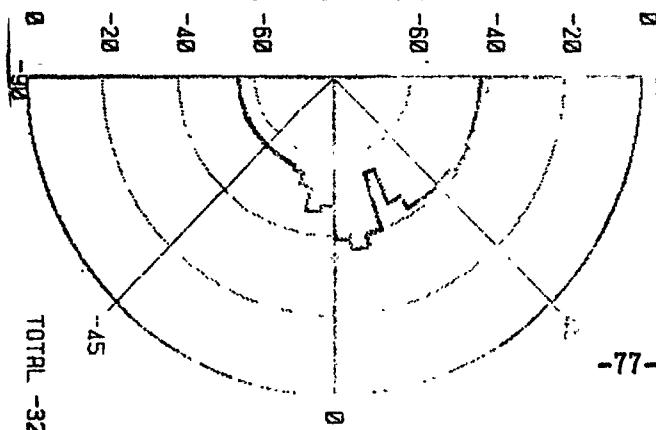
4000F  
6000L

2000F

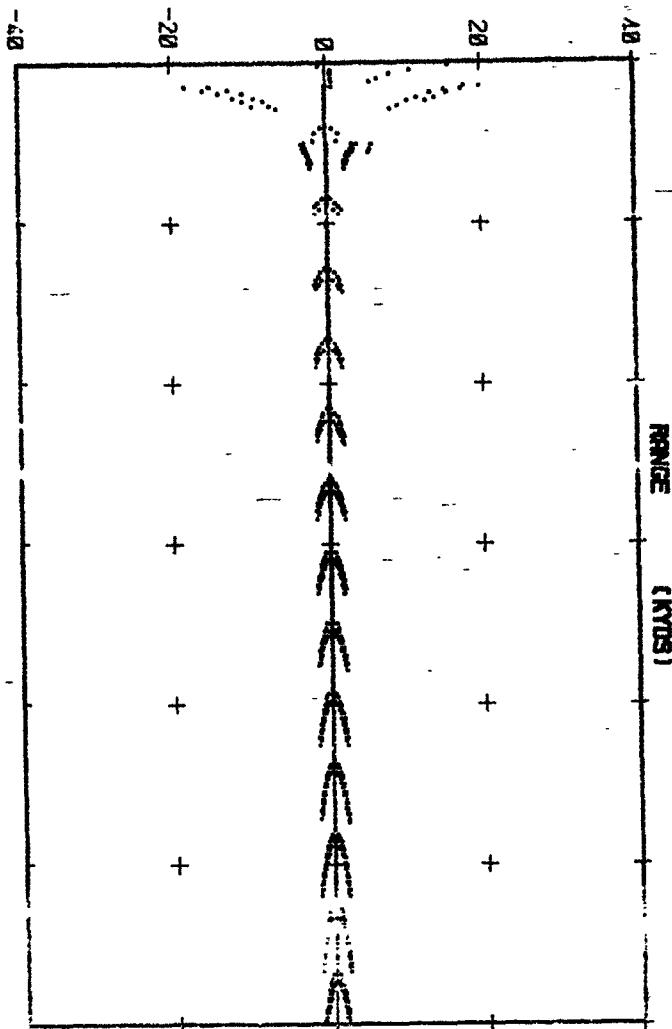
1000L

0

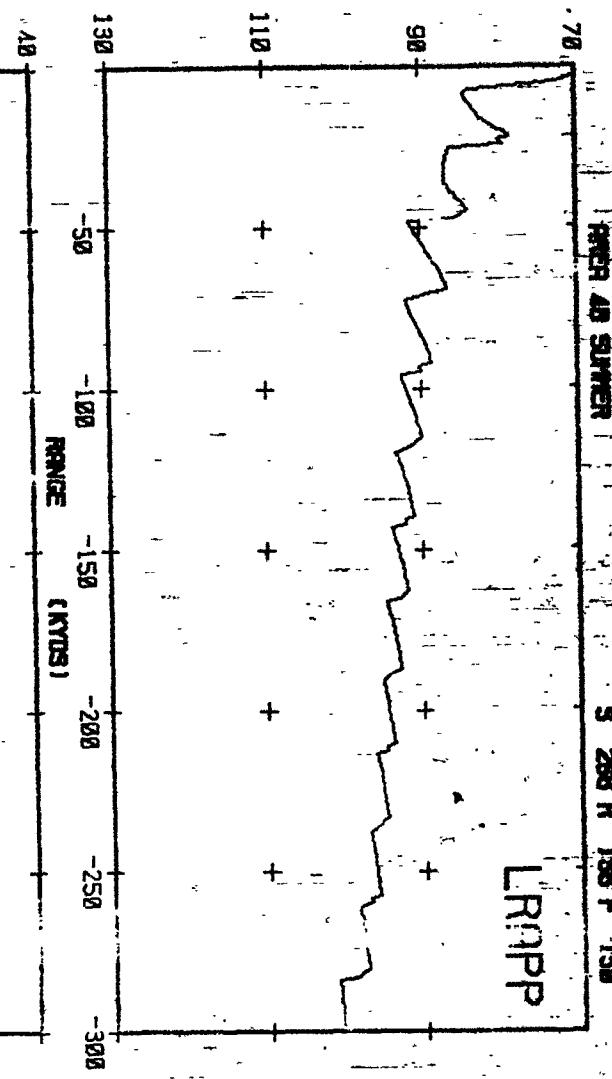
NOISE (DB)



### ARRIVAL ANGLE

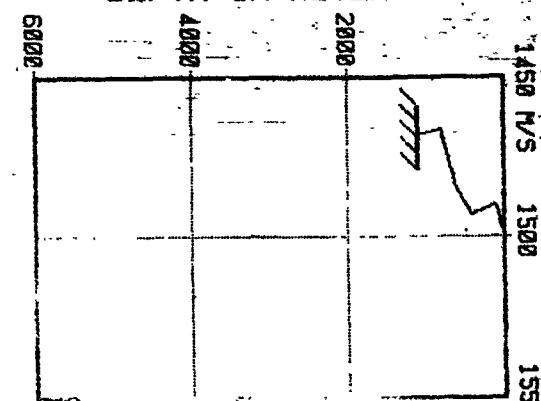


### DB LOSS

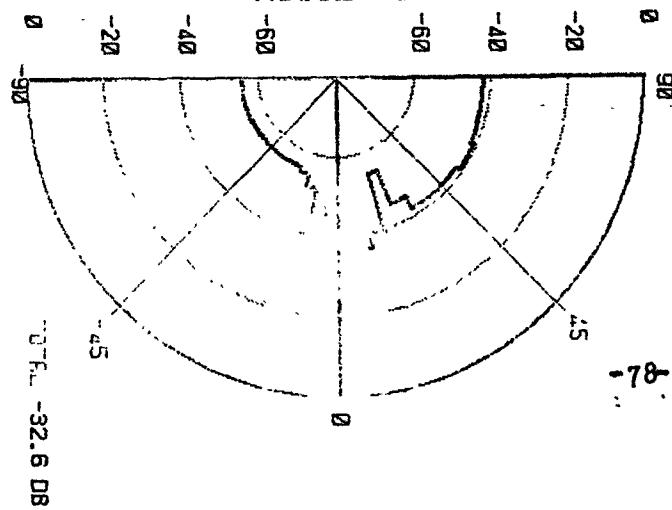


LRAAPP

### DEPTH IN METERS



### NOISE (DB)



-32.6 dB

70

AREA AB SUMMER

S 20 R 300 F 150

1450 M/S 1500 1550

LRAPP

## DB LOSS

90

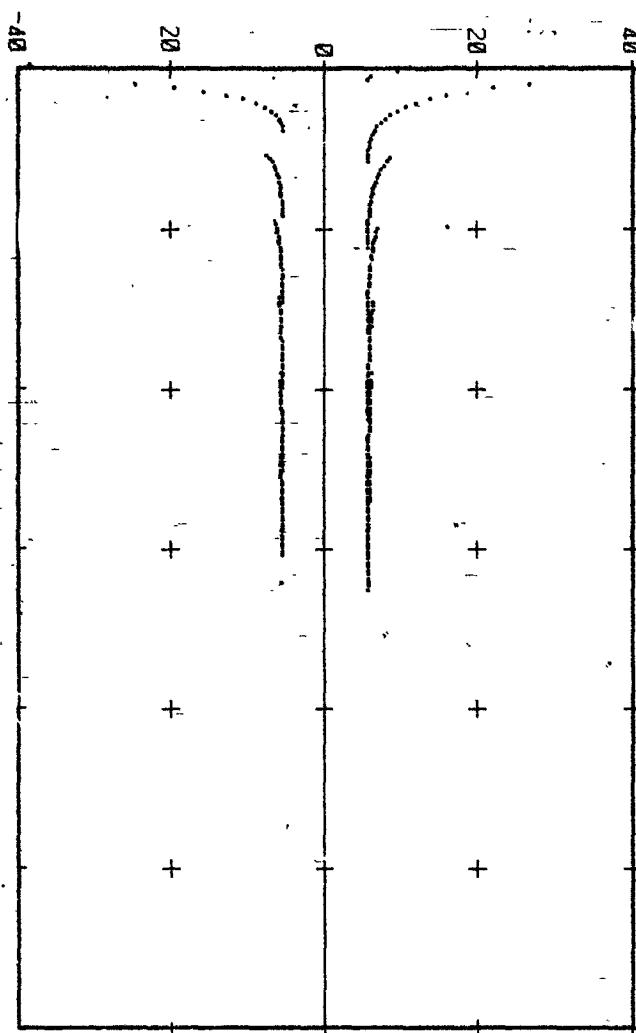
+ + + + + +

2000

130  
100  
70  
40  
10  
-50 -100 -150 -200 -250 -300

RANGE (KILOMETERS)

## ARRIVAL ANGLE



## DEPTH IN METERS

4000

2000

0

6000

4000

2000

0

-2000

-4000

-6000

-8000

-10000

-12000

-14000

-16000

-18000

-20000

-22000

-24000

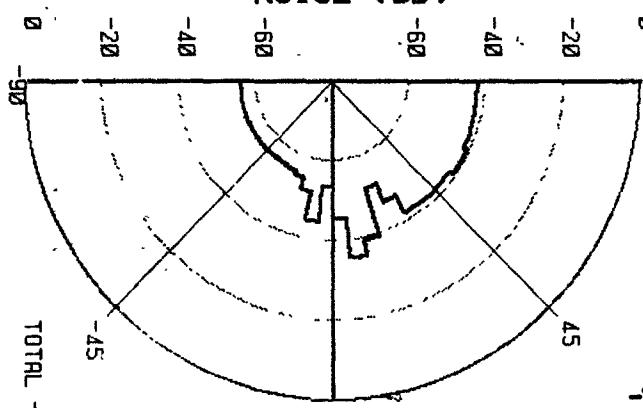
-26000

-28000

-30000

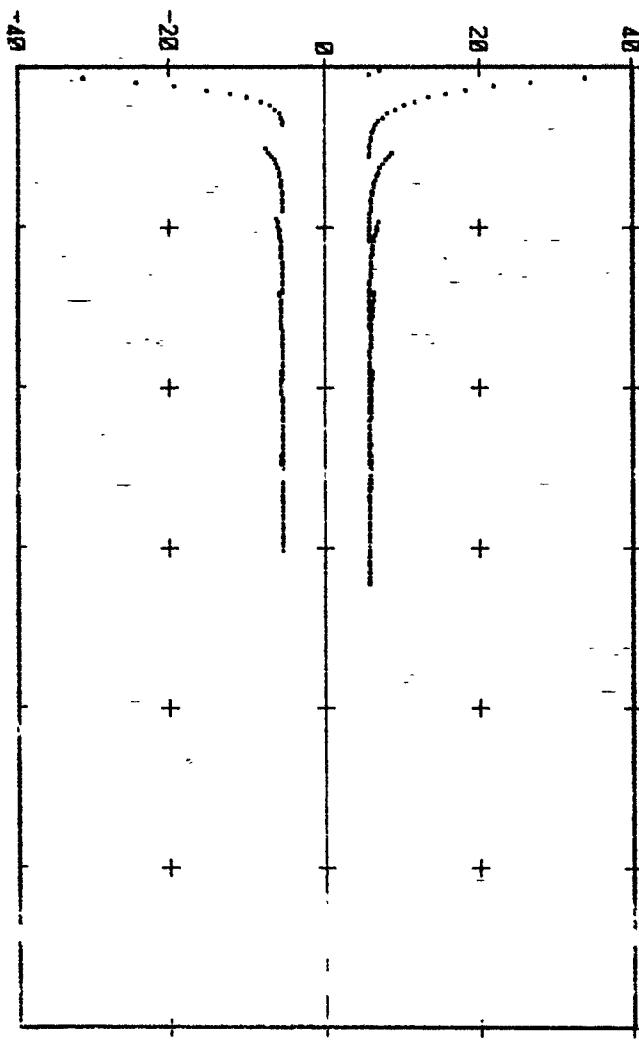
-79-

## NOISE (DB)

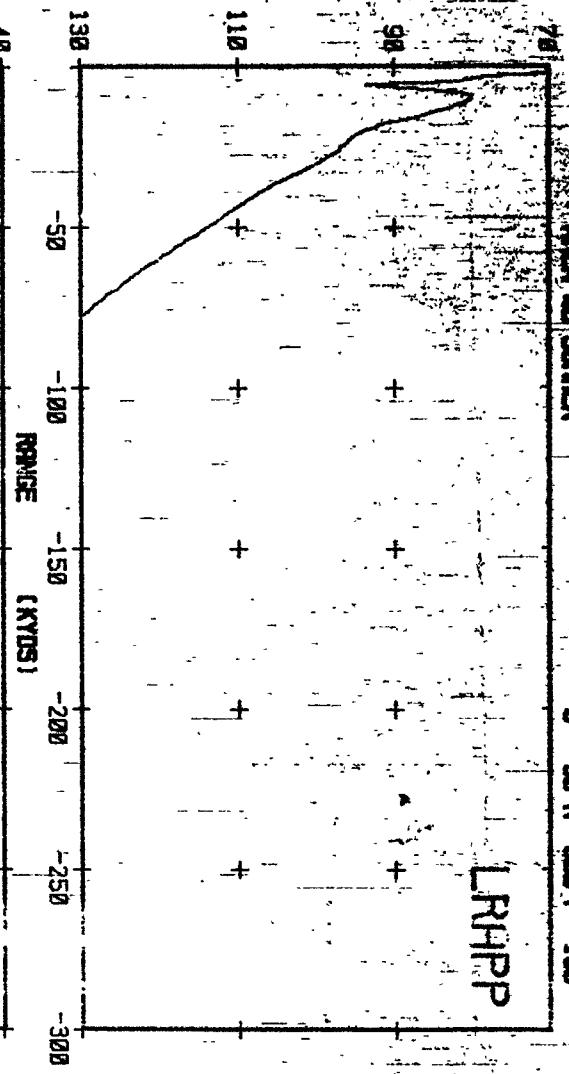


TOTAL -32.8 DB

### ARRIVAL ANGLE



### DB LOSS



LRRPP

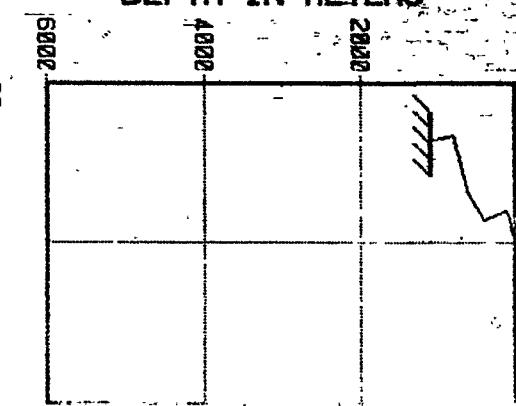
S 50 W 500 F 150

1450 M/S

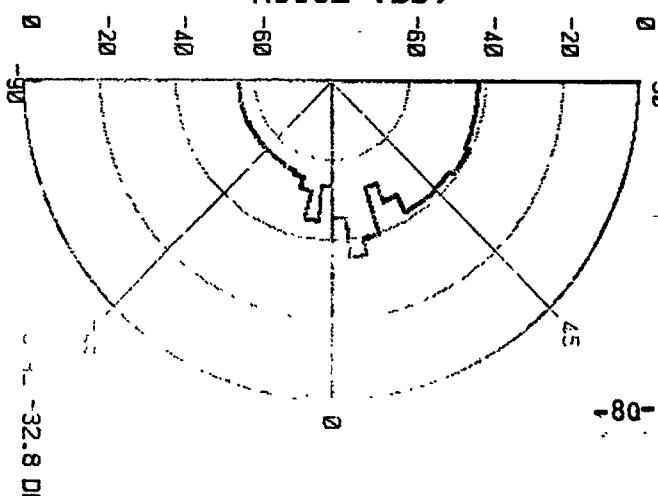
1500

250

### DEPTH IN METERS



### NOISE (DB)



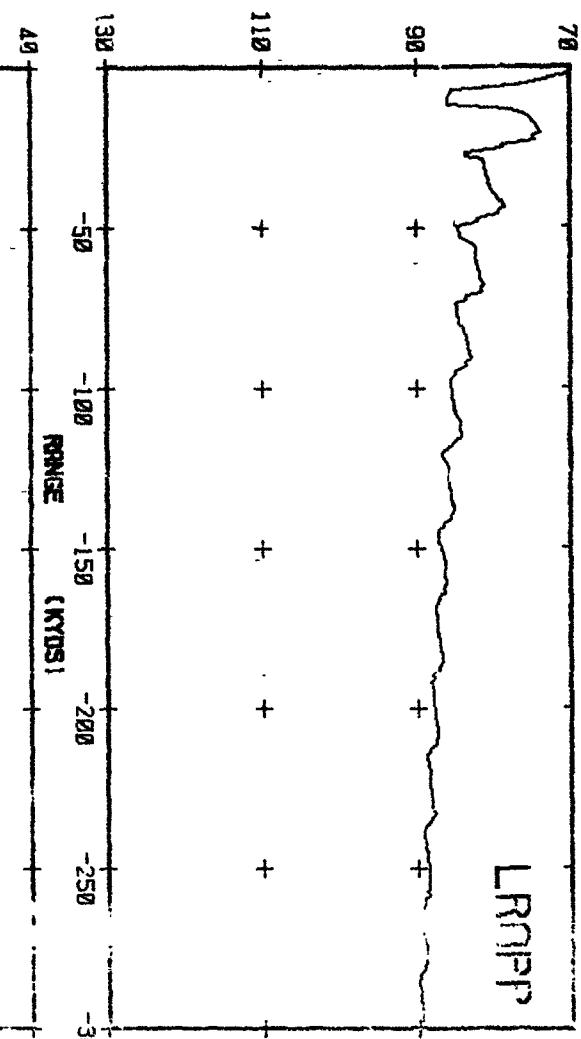
-32.8 DB

PRESS AB SUMMER

S 268 R 368 F 154

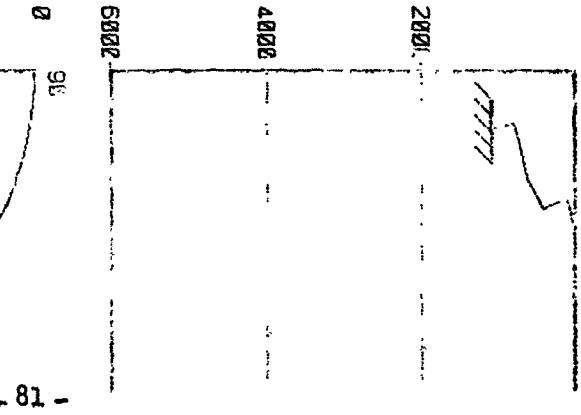
1450 N/Z 1526 1550

### DB LOSS

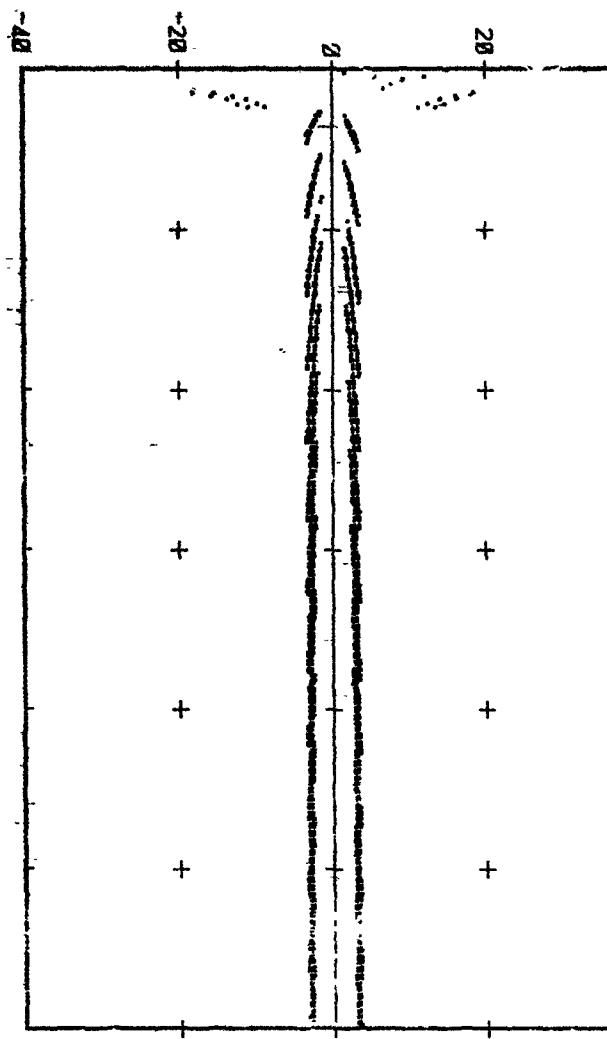


LRNPP

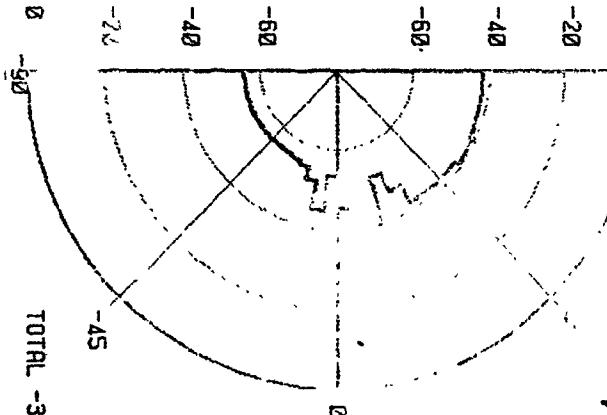
### DEPTH IN METERS



### ARRIVAL ANGLE



### NOISE (DB)



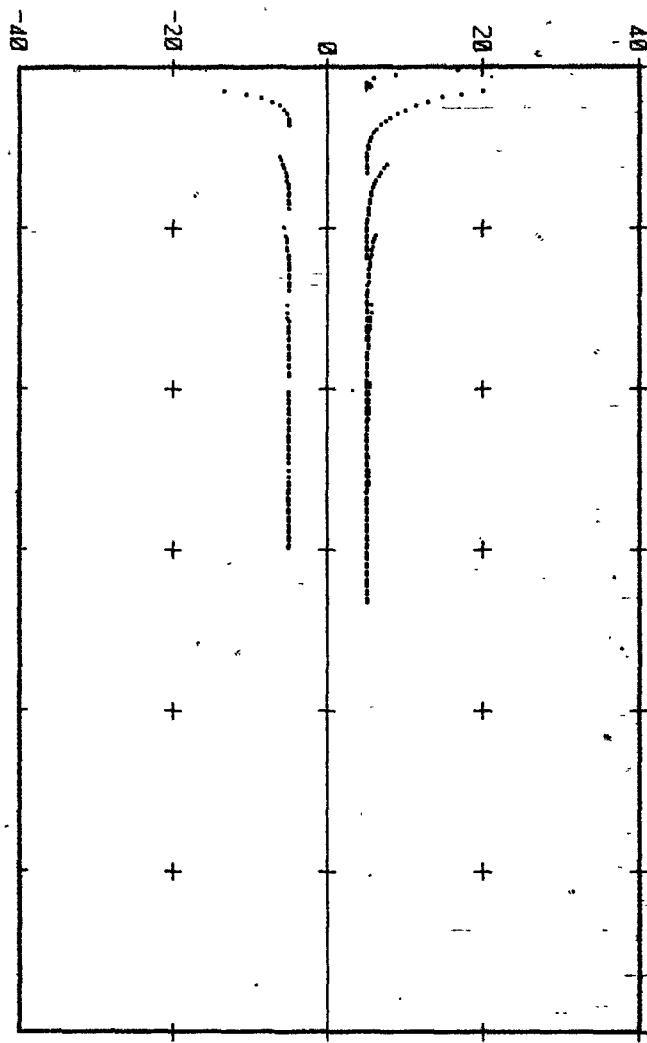
TOTAL -32.8 DB

PRED 40 SUMMER

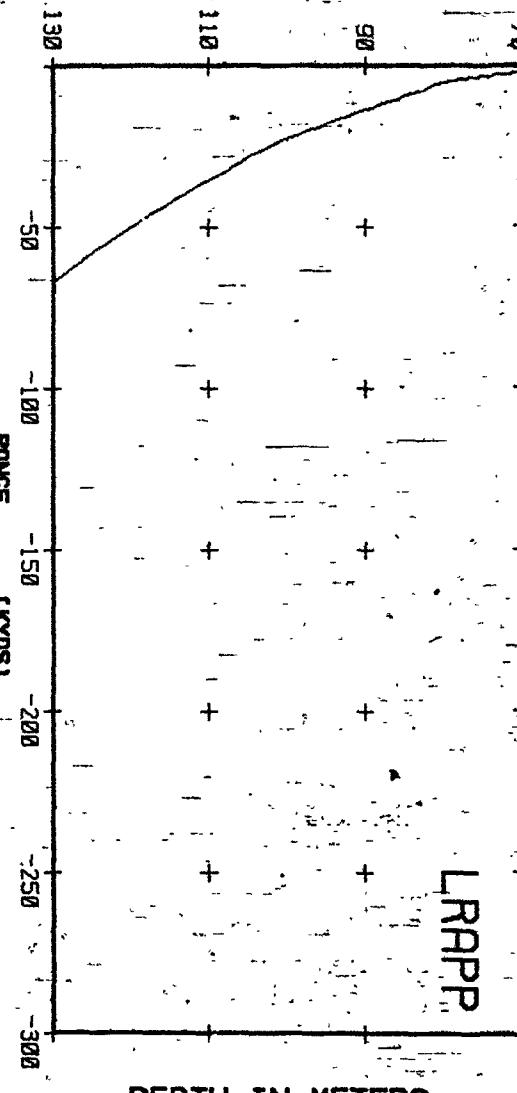
S 29 R 1000 F 150

1450 M/S 1500 1550

### ARRIVAL ANGLE

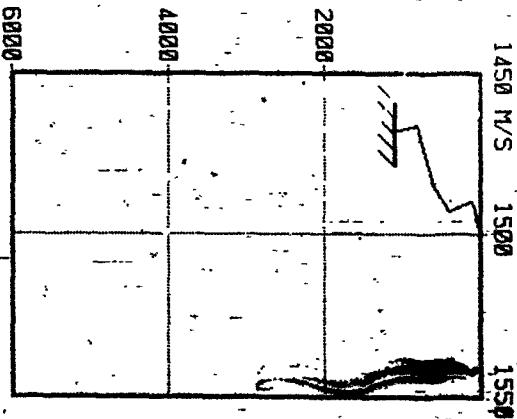


### DB LOSS

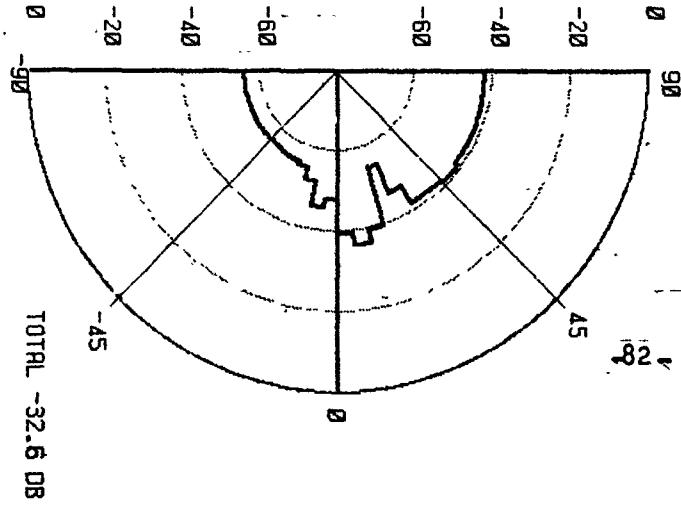


L RAPP

### DEPTH IN METERS



### NOISE (DB)



ARR AB SIMMER

S 50 R 1000 F 150

1450 M/S

LRNPP

DB LOSS

90

110

130

150

170

190

210

230

250

270

290

310

330

350

370

390

410

430

450

470

490

510

530

550

570

590

610

630

650

670

690

710

730

750

770

790

810

830

850

870

890

910

930

950

970

990

1010

1030

1050

1070

1090

1110

1130

1150

1170

1190

1210

1230

1250

1270

1290

1310

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1790

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1850

1870

1890

1910

1930

1950

1970

1990

2010

2030

2050

2070

2090

2110

2130

2150

2170

2190

2210

2230

2250

2270

2290

2310

2330

2350

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2990

3010

3030

3050

3070

3090

3110

3130

3150

3170

3190

3210

3230

3250

3270

3290

3310

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4990

5010

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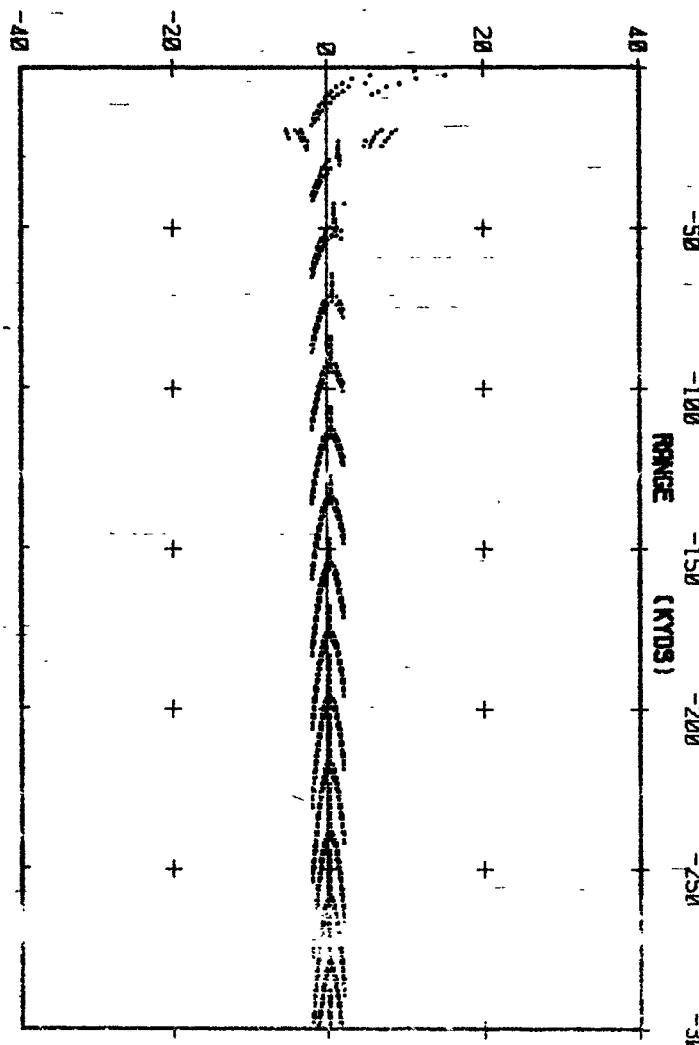
5790

5810

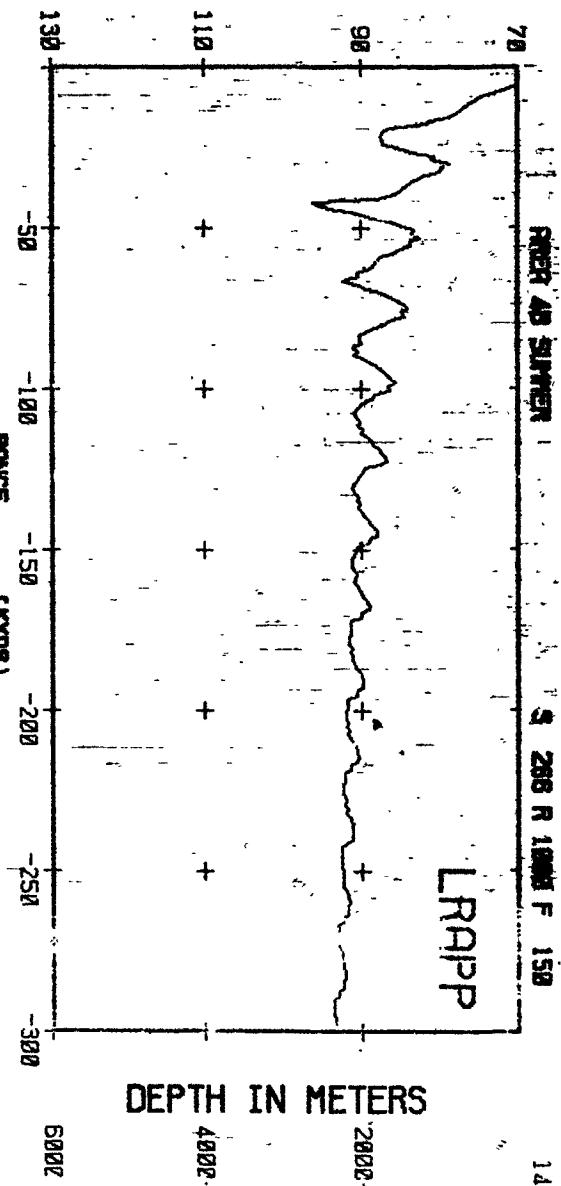
5830

5850

### ARRIVAL ANGLE



### DB LOSS



RAN 40 SUMMER

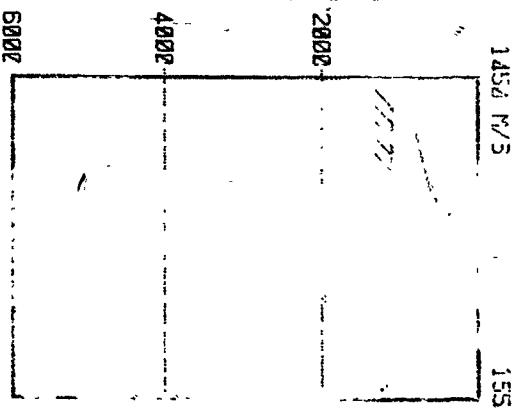
S 268 R 1800 F 150

1450 M/S

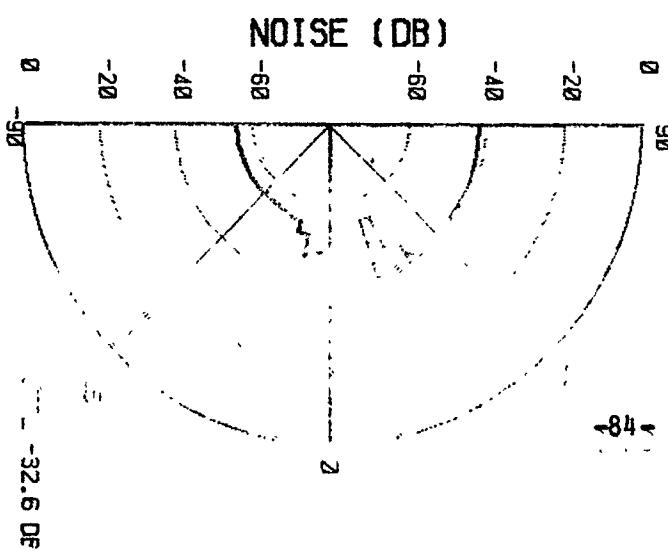
1550

LRAFP

### DEPTH IN METERS



### NOISE (DB)



80

40

20

0

-32.6 DF

70

S

28 N

1312

F

150

1450

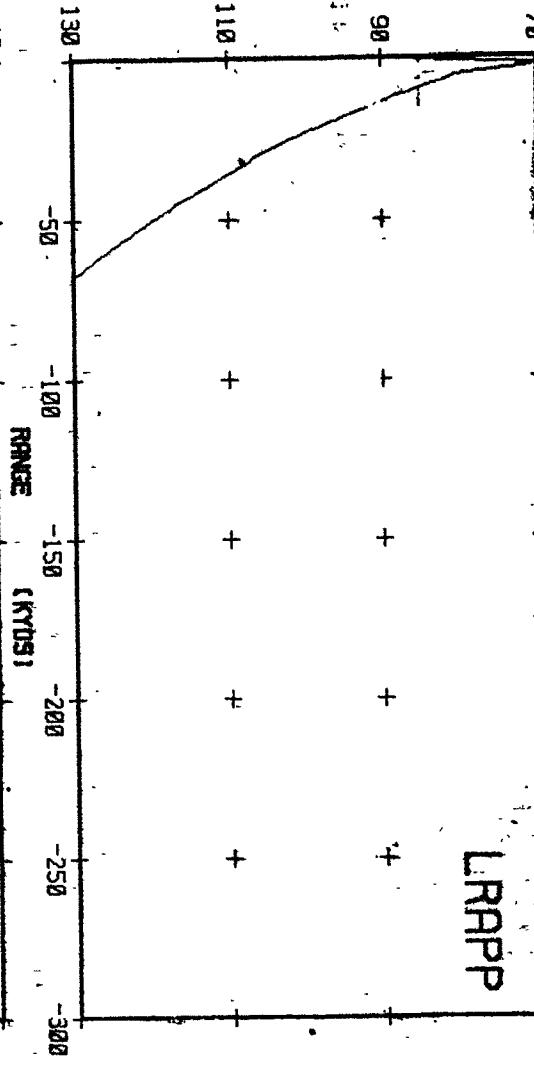
M/5

1500

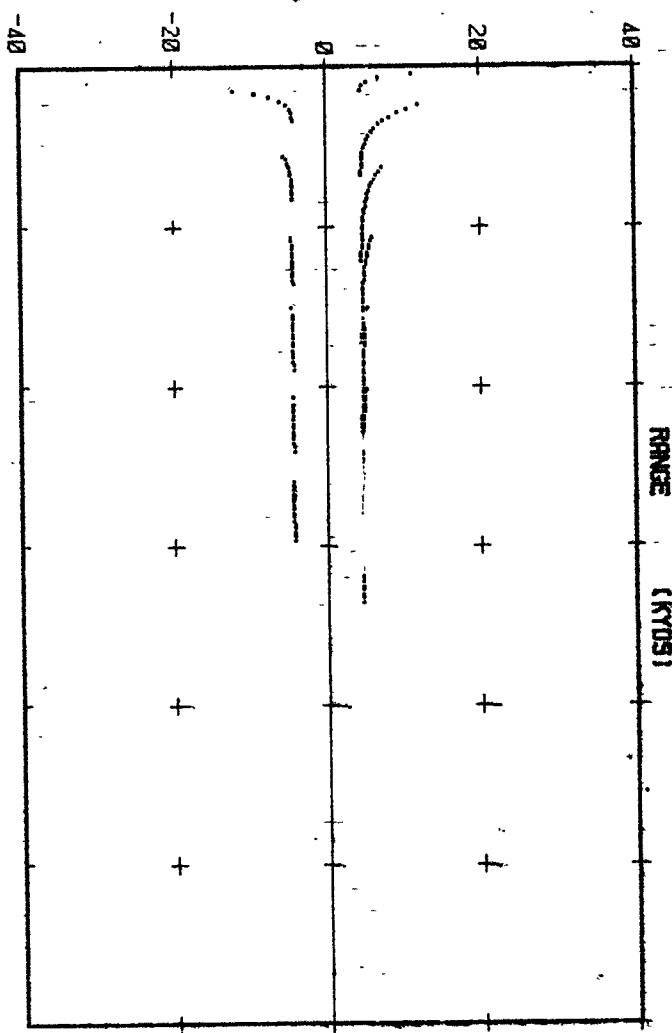
1550

LRAPP

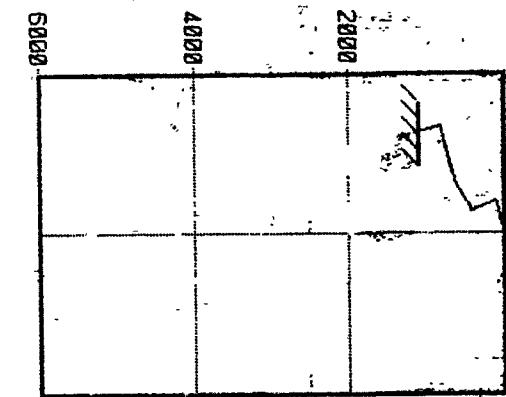
DB LOSS



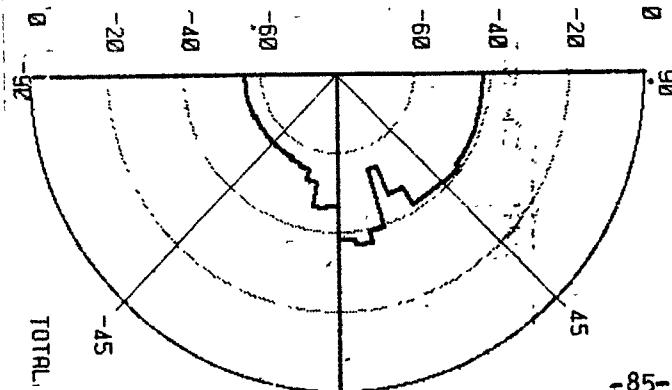
ARRIVAL ANGLE



DEPTH IN METERS



NOISE (DB)



TOTAL. -32.5 DB

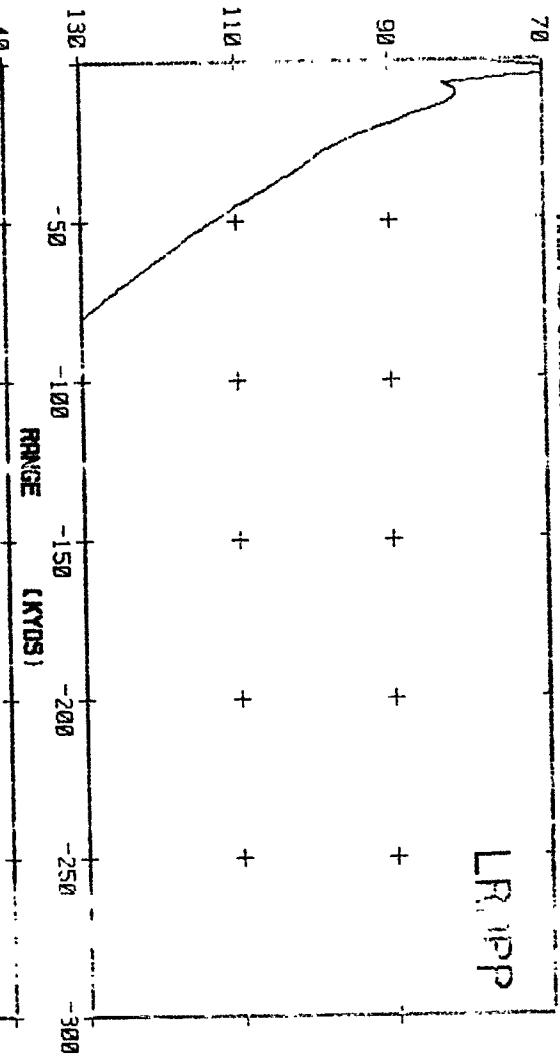
RIVER AB SUMMER

S 50 R 1312 F 158

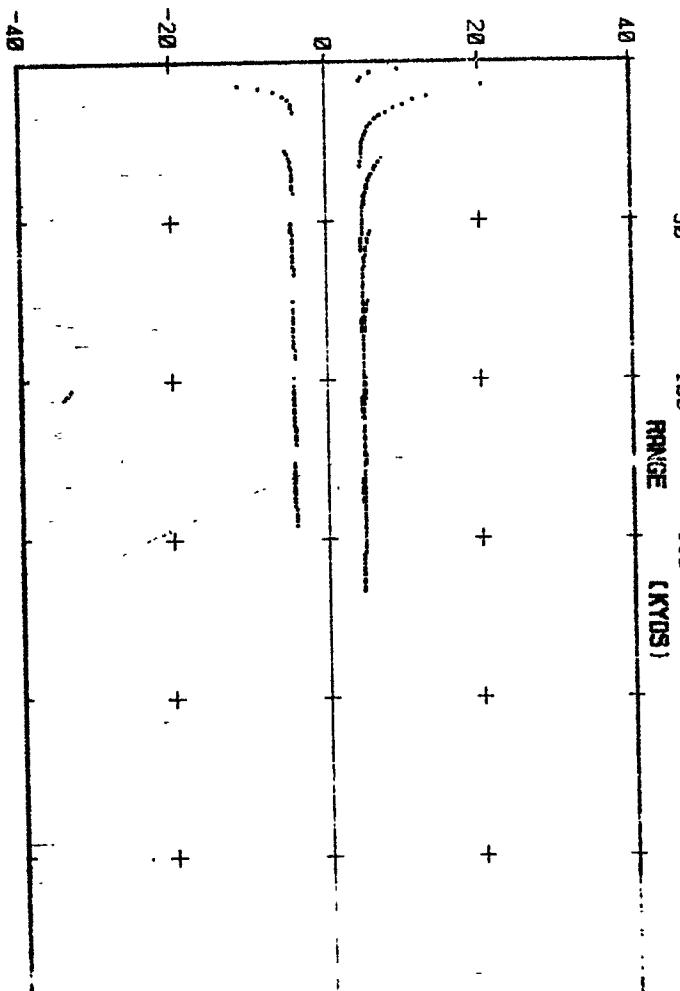
1450 M/S 1500 1550

dB LOSS

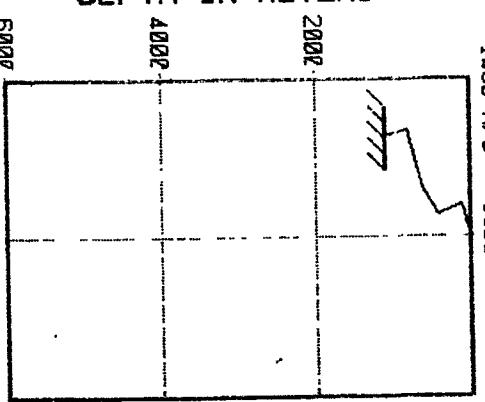
LFR IPP



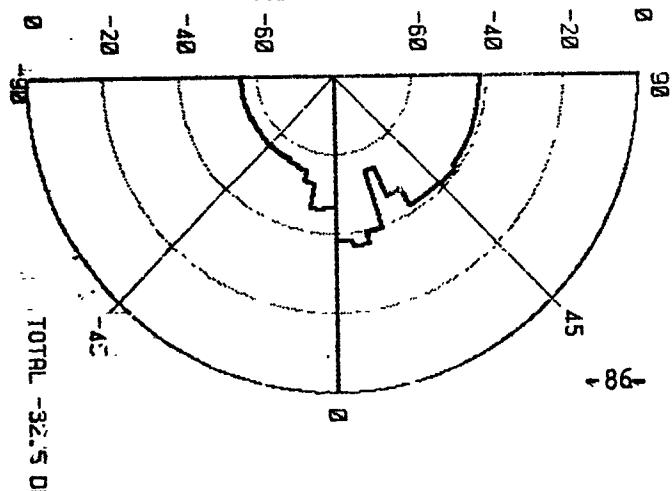
ARRIVAL ANGLE



DEPTH IN METERS



NOISE (DB)



TOTAL -32.5 DB

ARR AB SUMMER

S . 285 R 1312 F 153

1450 N.

LRRP

DB LOSS

110

90

70

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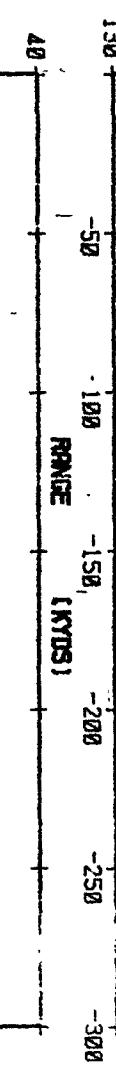
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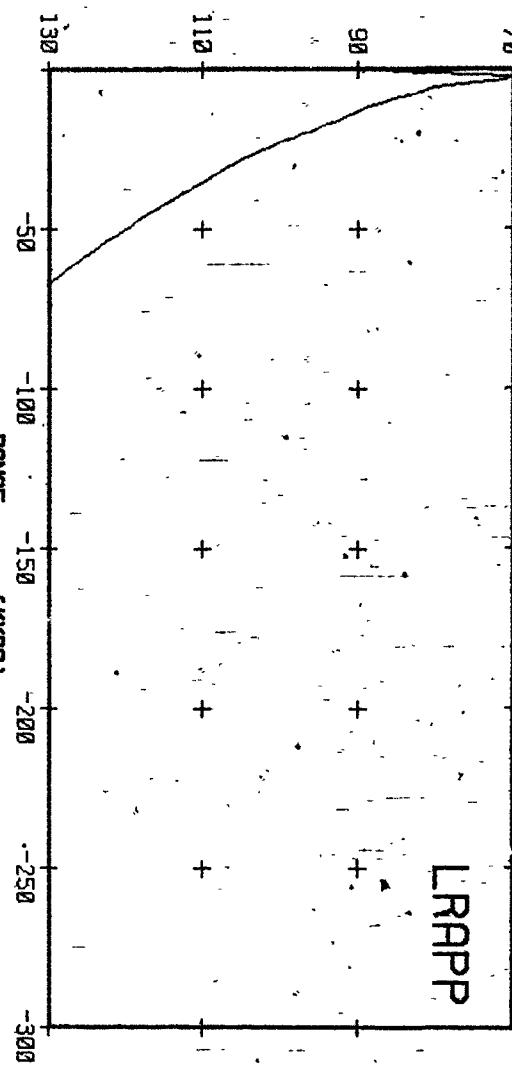
ARR 4H SUMMER

S 28 R 1500 F 150

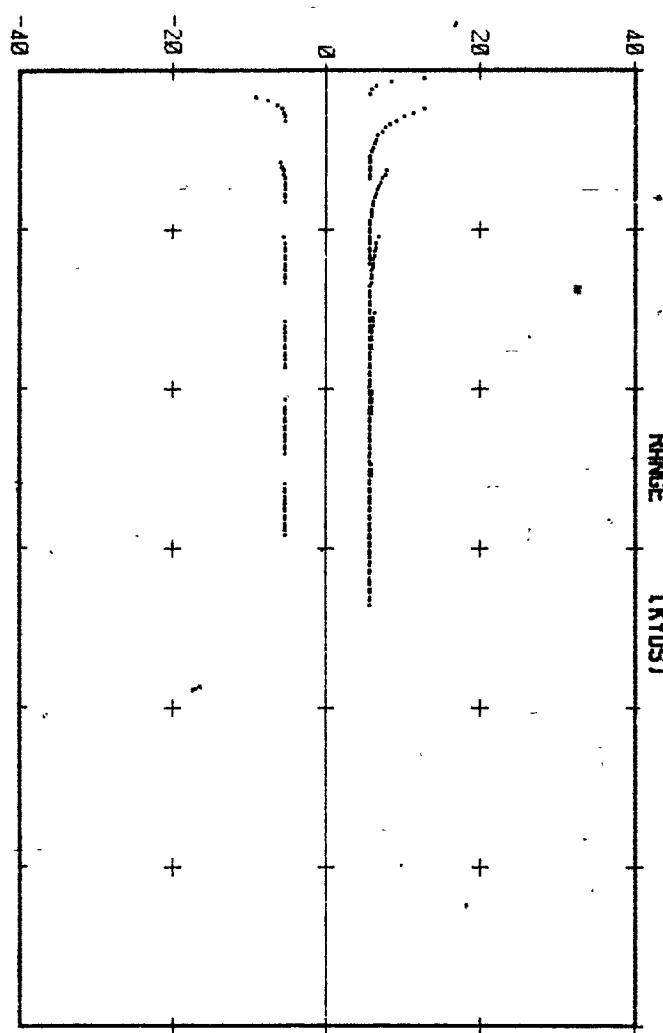
1450 M/S 1500 1550

LRAPP

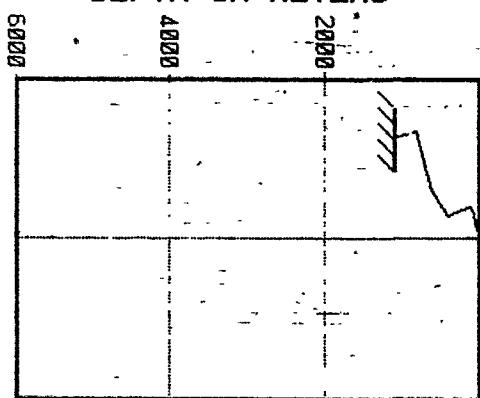
DB LOSS



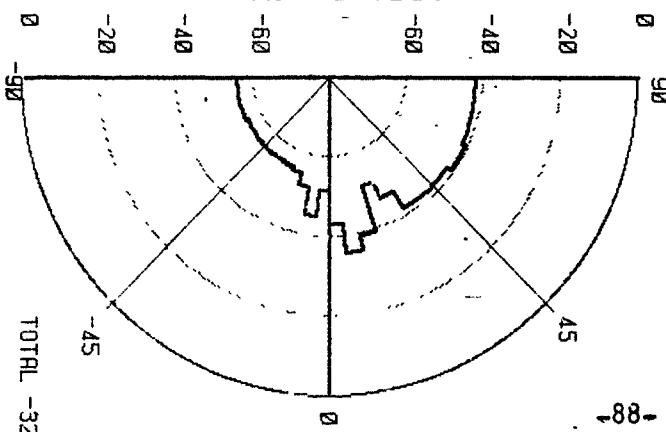
ARRIVAL ANGLE



DEPTH IN METERS



NOISE (DB)



TOTAL -32.8 DB

-88-

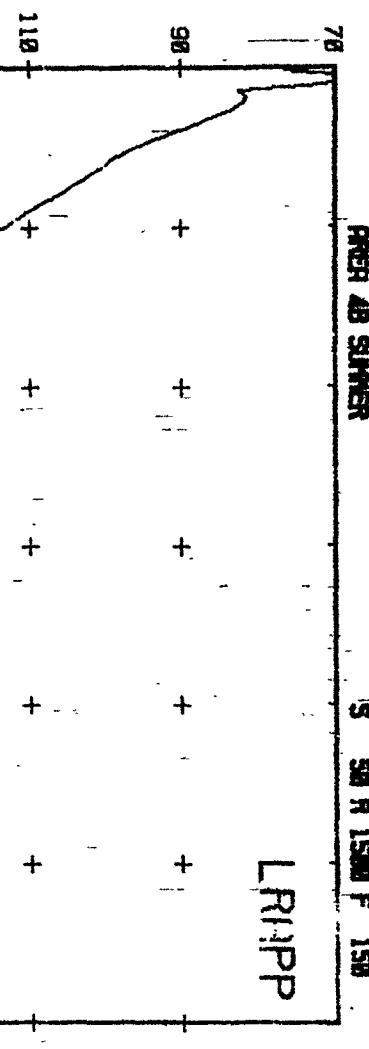
AKER AB SURFER

S 50 R 150 F 150

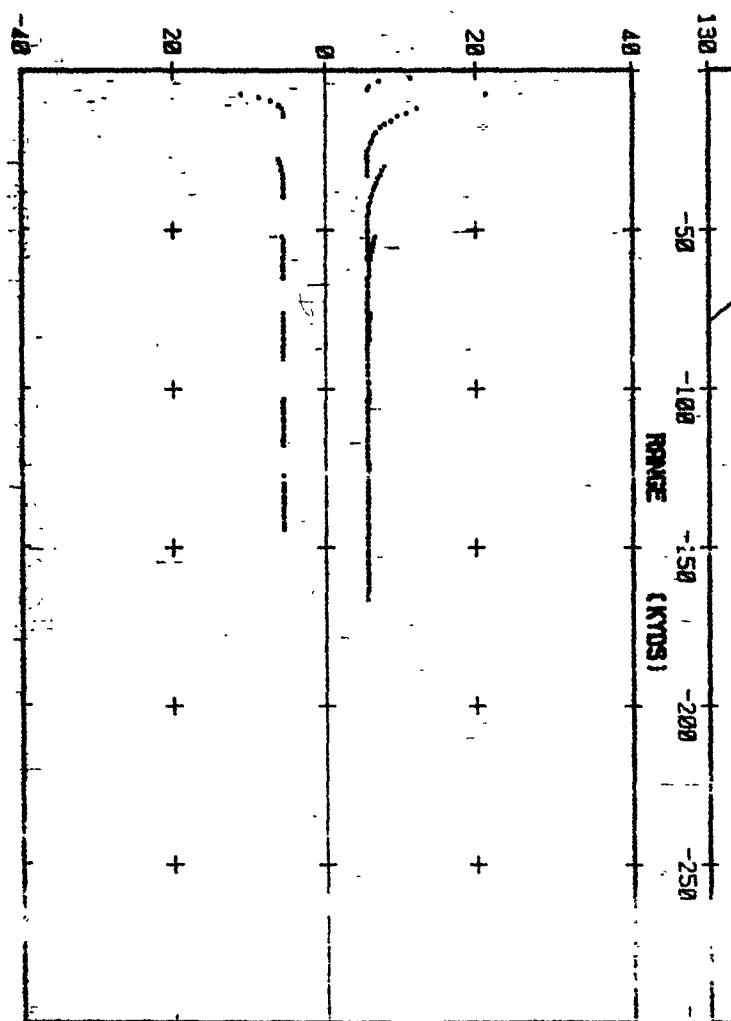
1450 M/S 1500 1550

LRI:PP

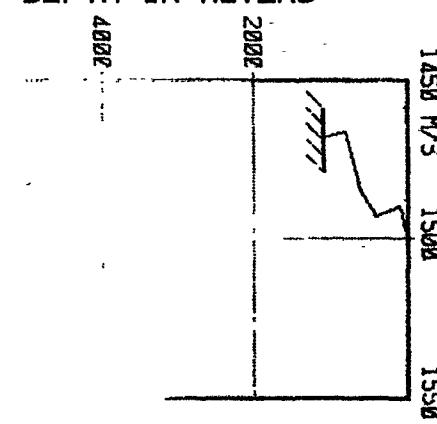
DB LOSS



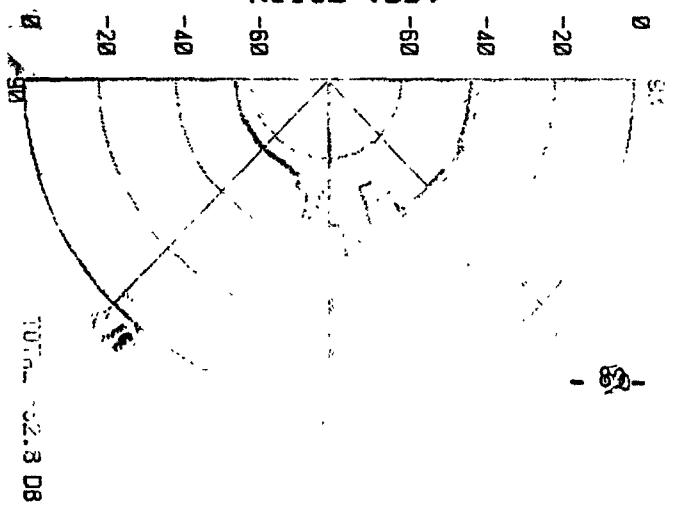
ARRIVAL ANGLE



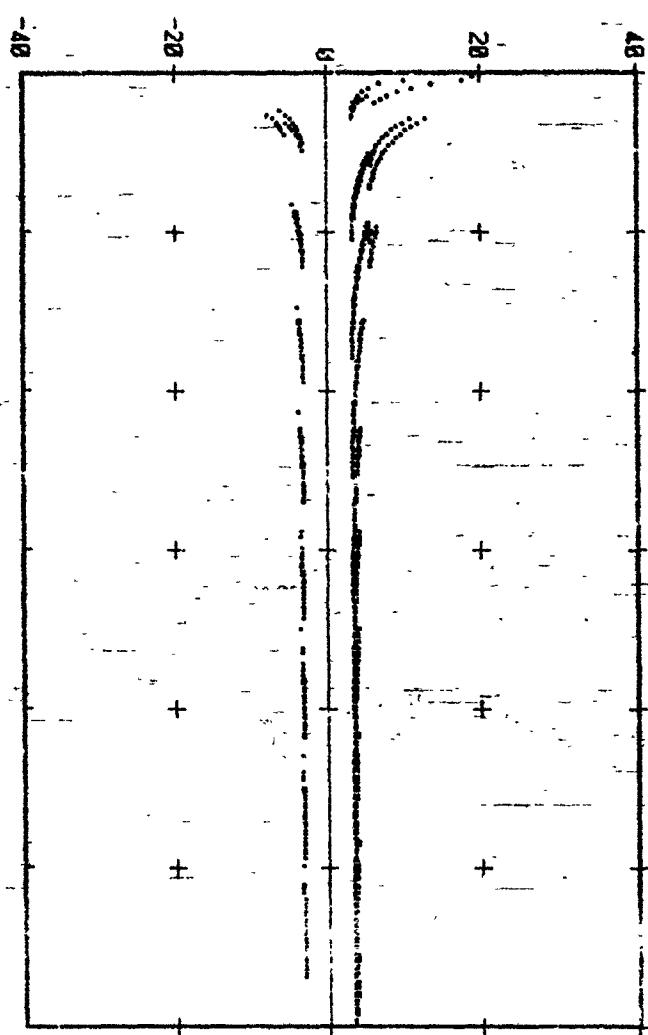
DEPTH IN METERS



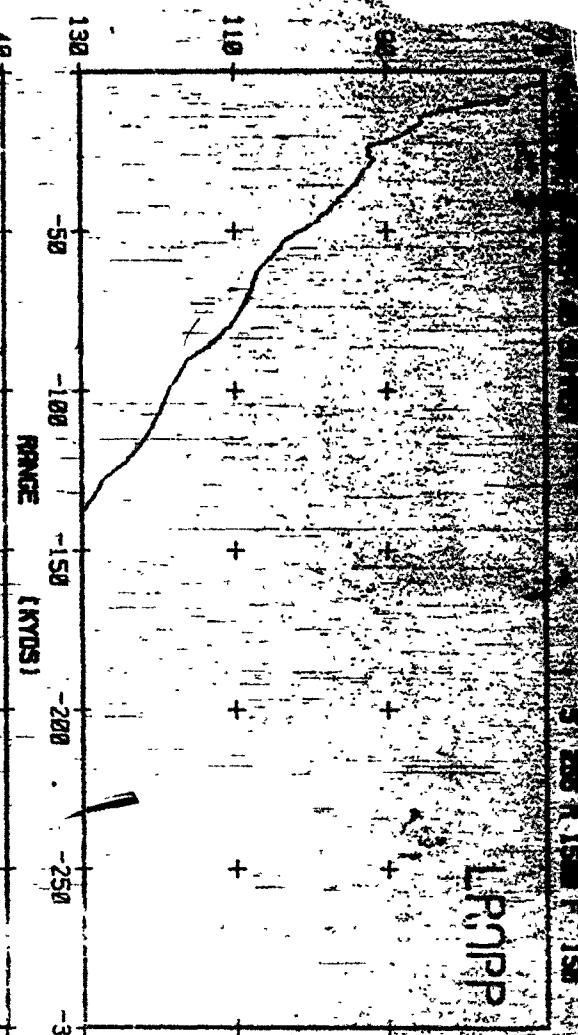
NOISE (DB)



### ARRIVAL ANGLE

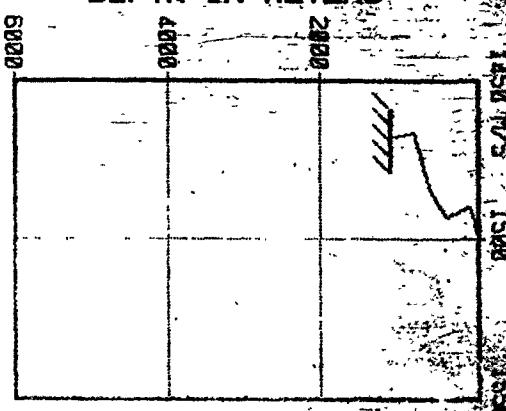


### DB LOSS

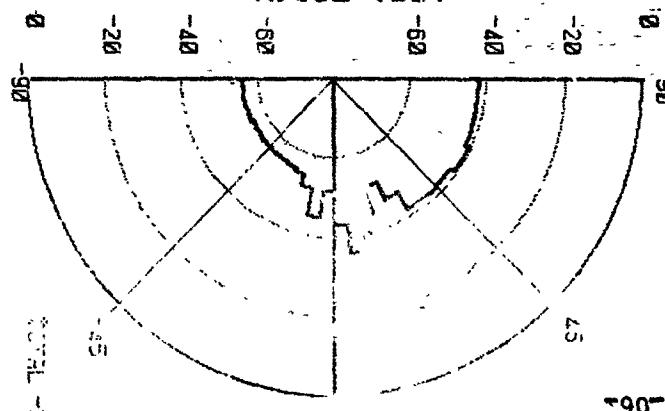


LPP

### DEPTH IN METERS



### NOISE (DB)



TOTAL -32.8 dB

FIG. 43 SUMMER

S 29 R 2625 F : 50

1450 M/S 1500 1550

L RAPP

DB LOSS

114

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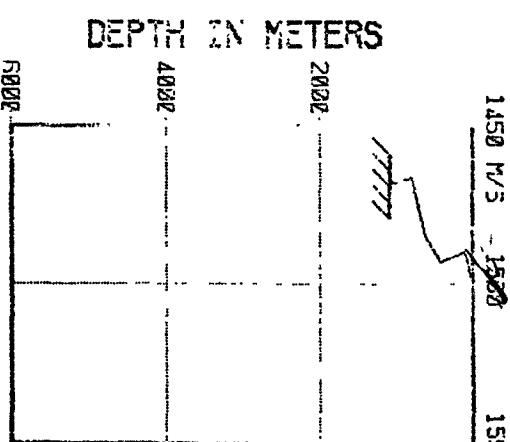
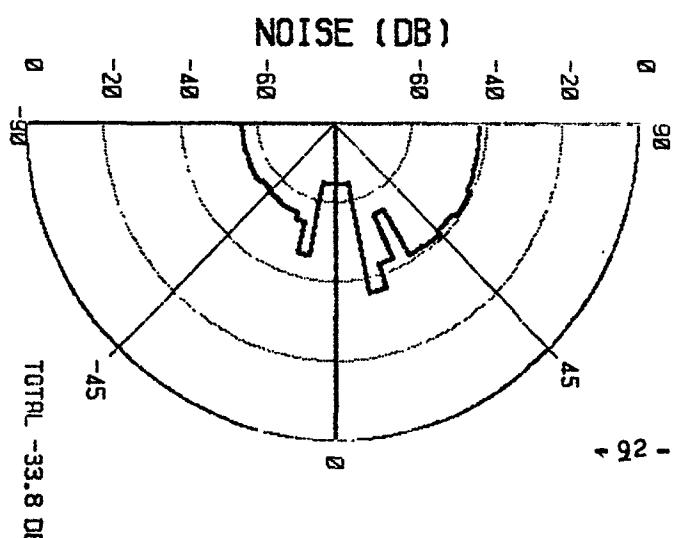
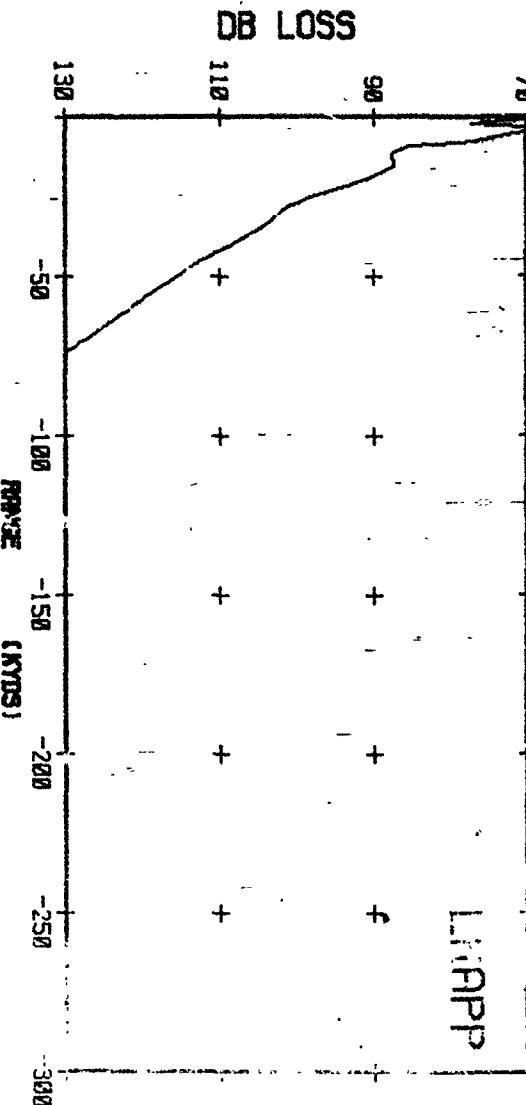
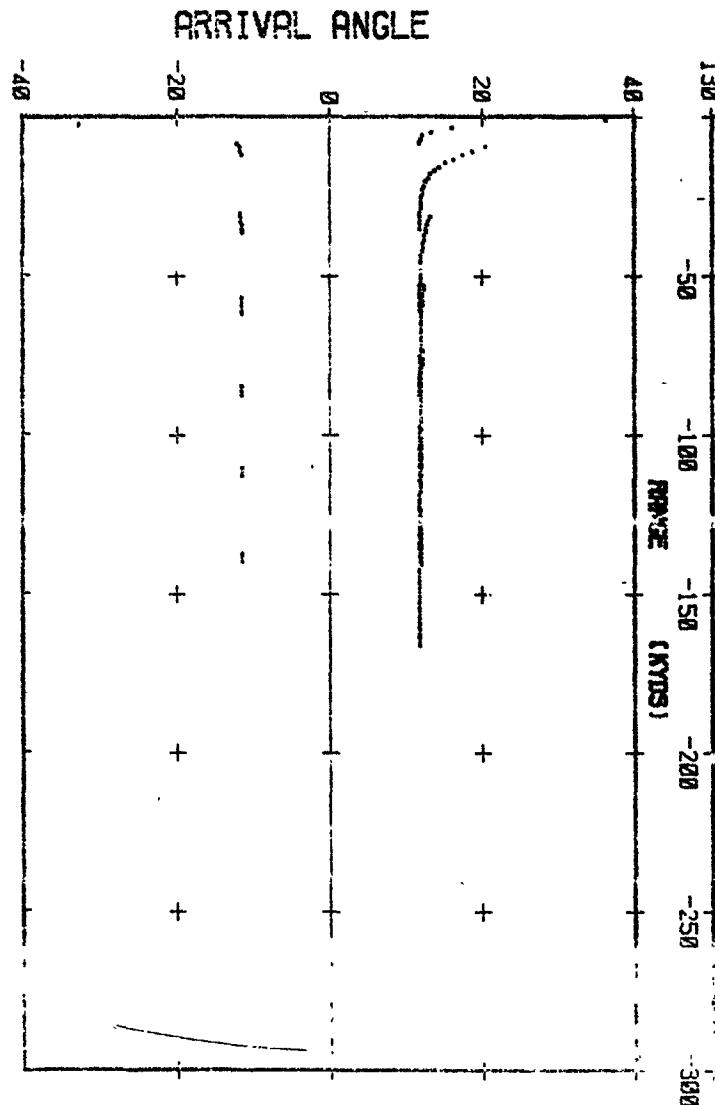
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114

1450 Hz - 1500 1550  
ARRIVAL ANGLE S S R S S 150

ARRIVAL ANGLE  
LIAAPP



ATLANTIC OCEAN

3 268 N 325 E :23

145°

177°7

200°4

222°1

243°8

265°5

287°2

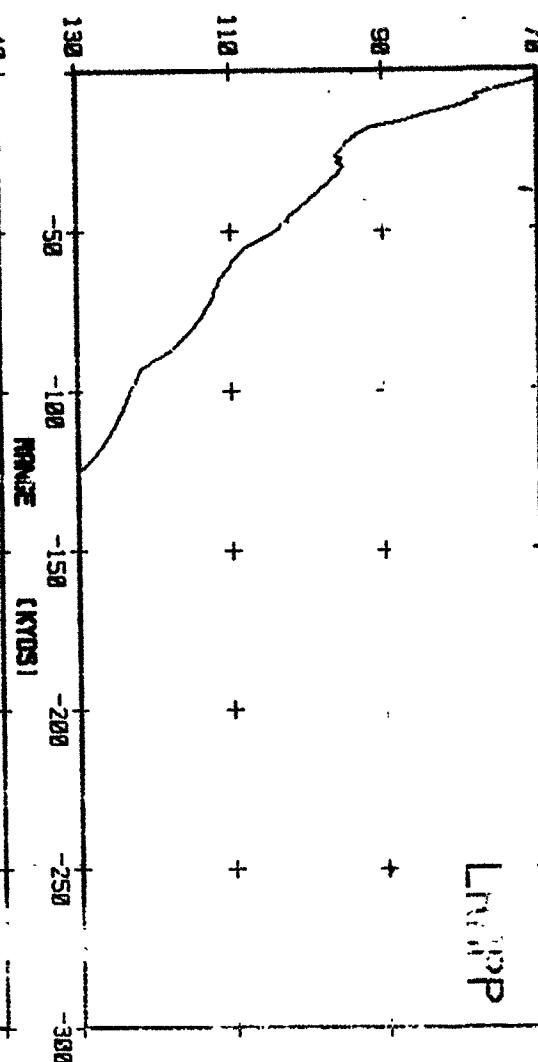
308°9

330°6

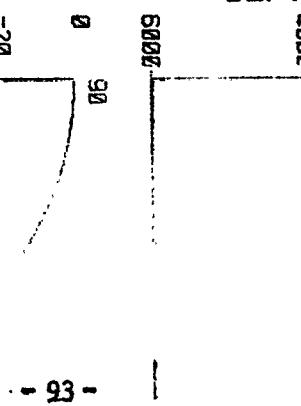
352°3

373°0

### DB LOSS



### DEPTH IN METERS

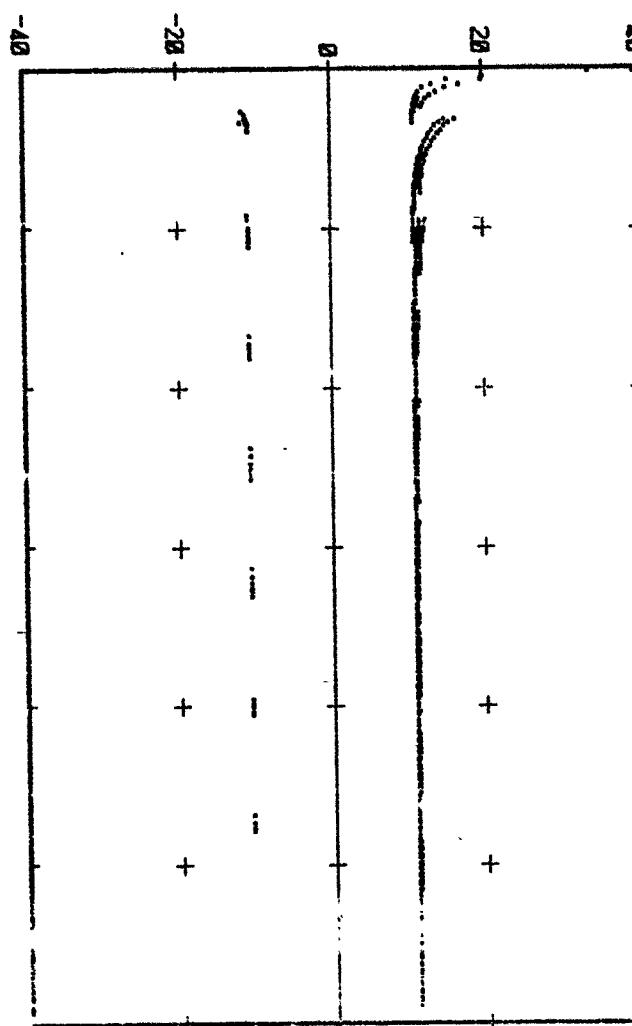


- 93 -

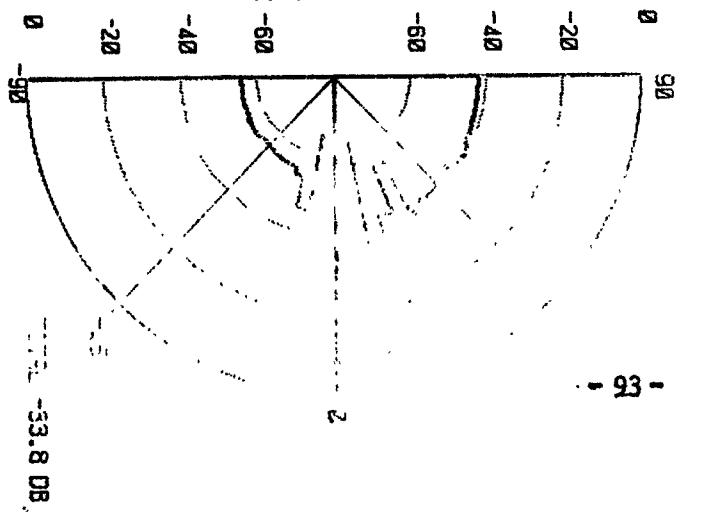
2

2

### ARRIVAL ANGLE



### NOISE (DB)

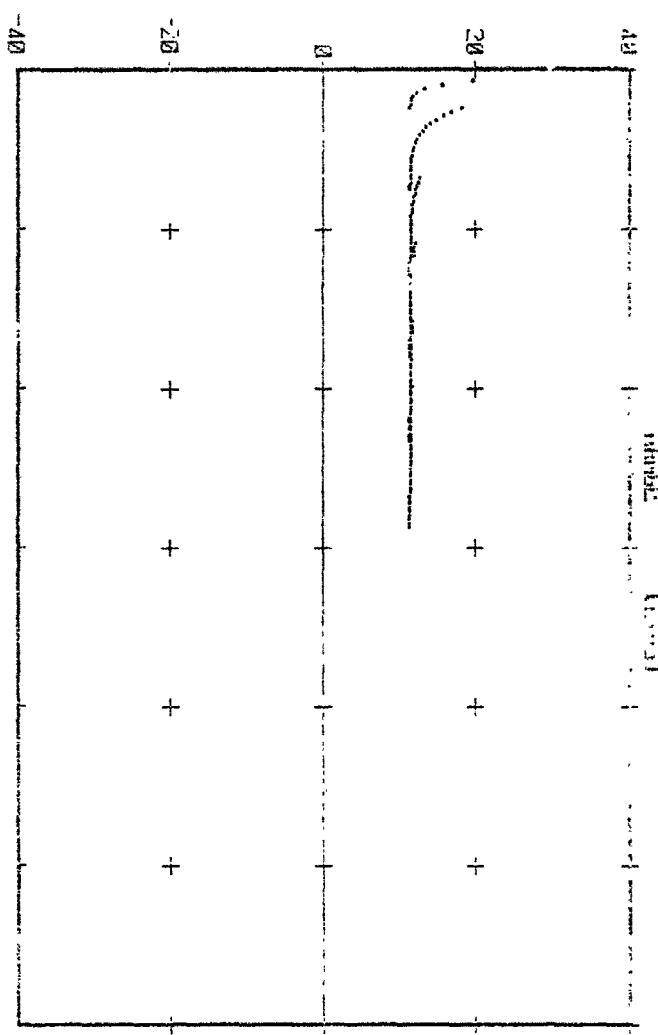


- 93 -

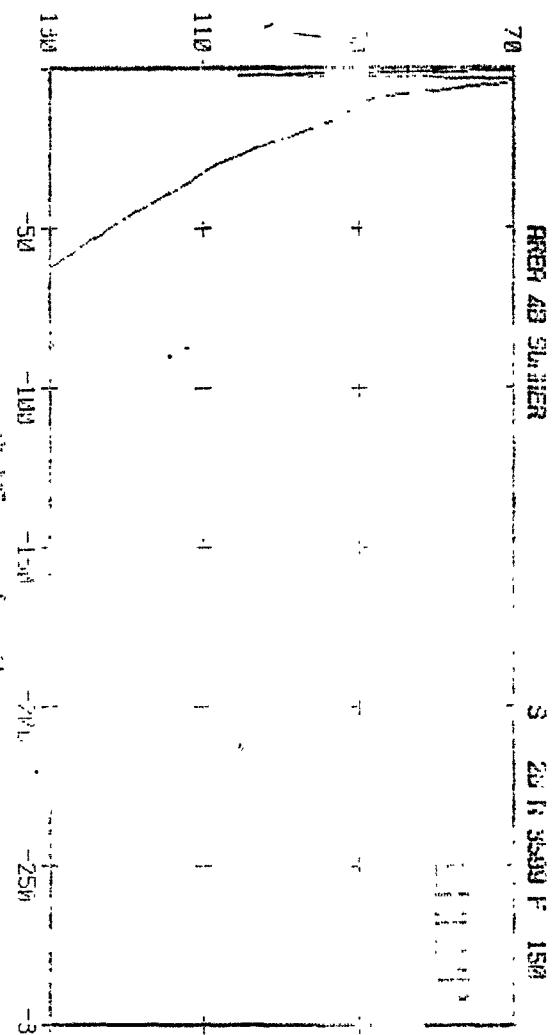
2

2

## ARRIVAL ANGLE



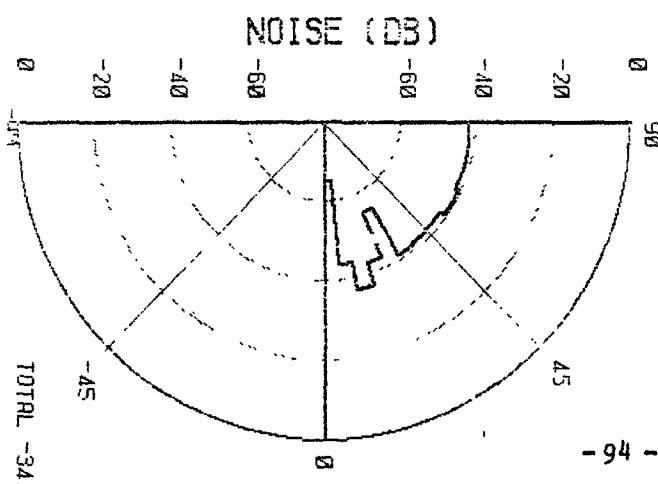
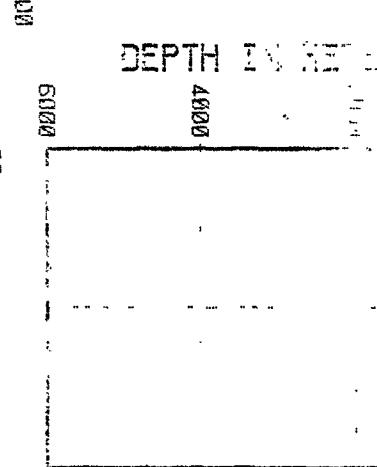
## DB LOSS



FARER 4B SURFER

S 25 K 3500 F 150

14.0 16.5 1500 1550



-94 -

TOTAL -34.0 DB

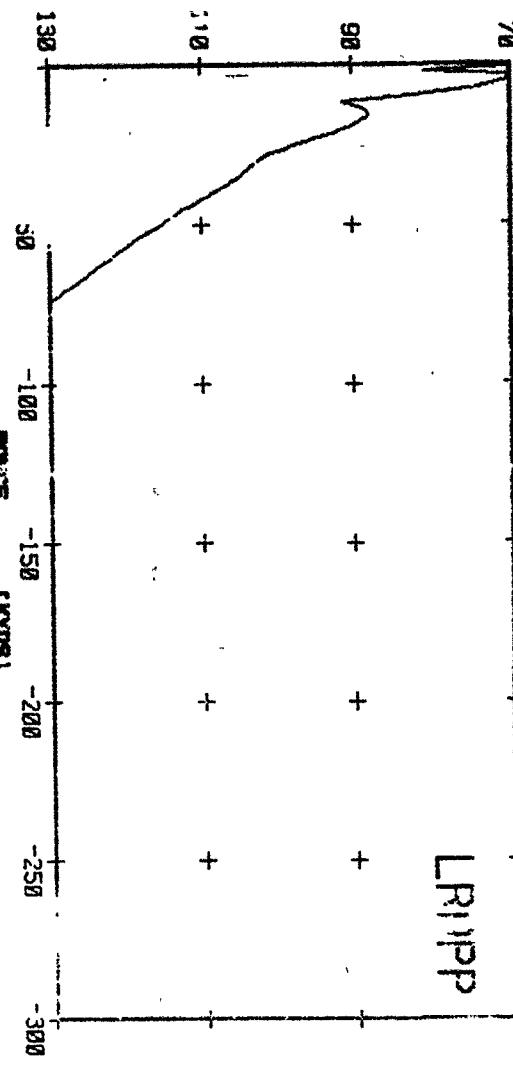
FRIER 48 SUMMER

S S 50 R 5500 F 150

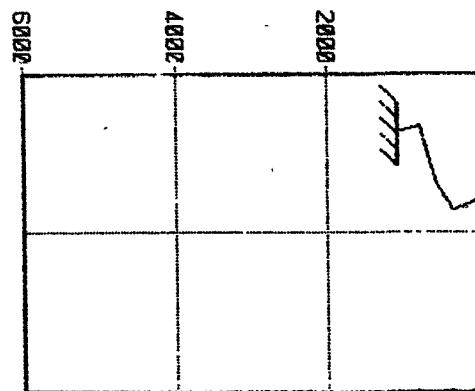
1450 M/S 1500 1550

LRI IPP

DB LOSS

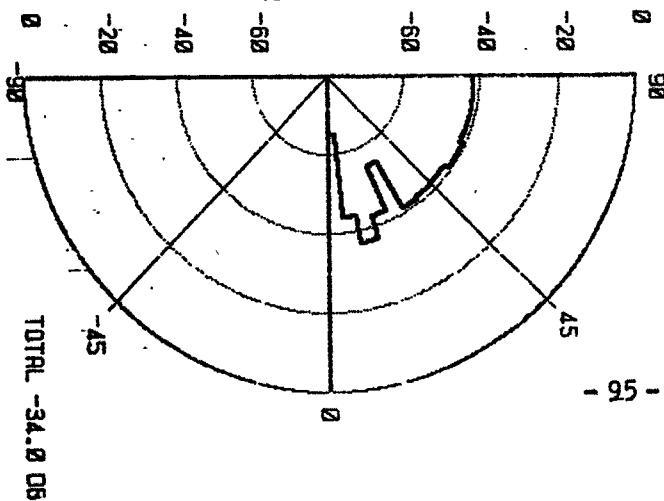
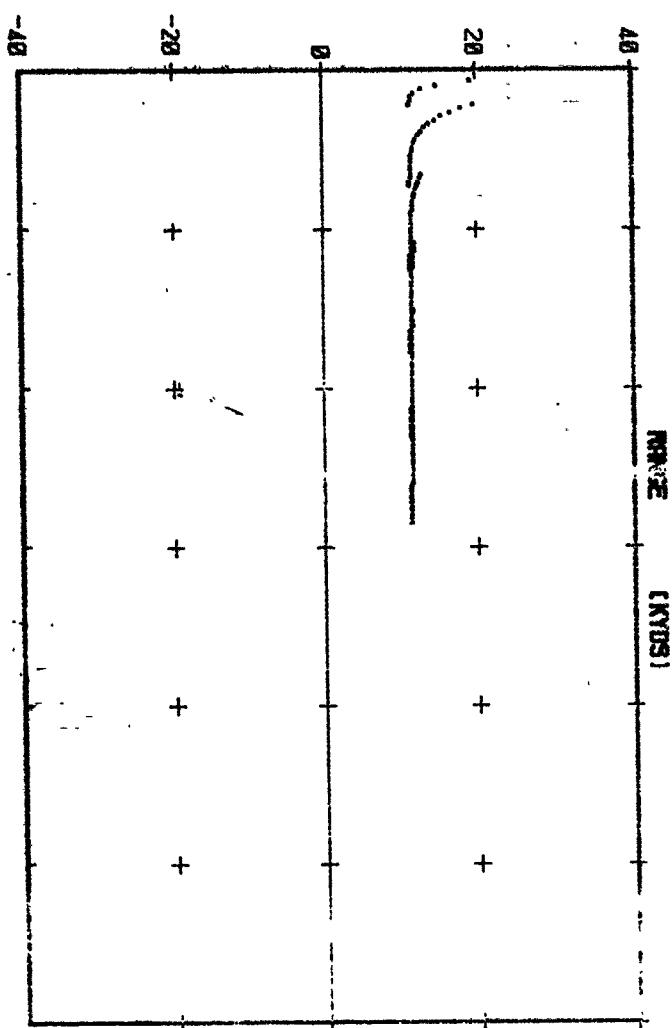


DEPTH IN METERS

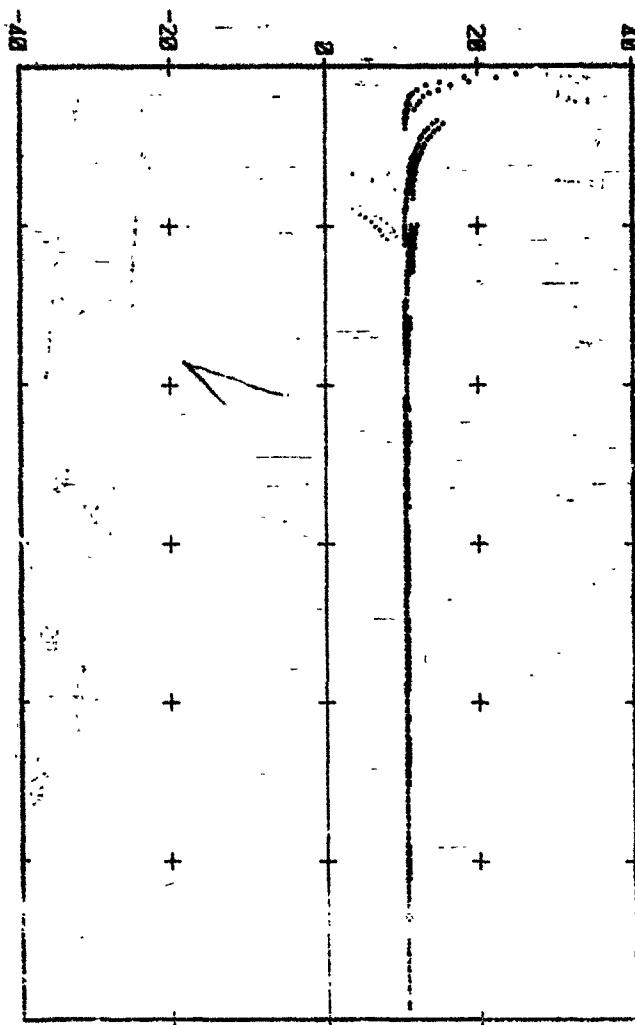


NOISE (DB)

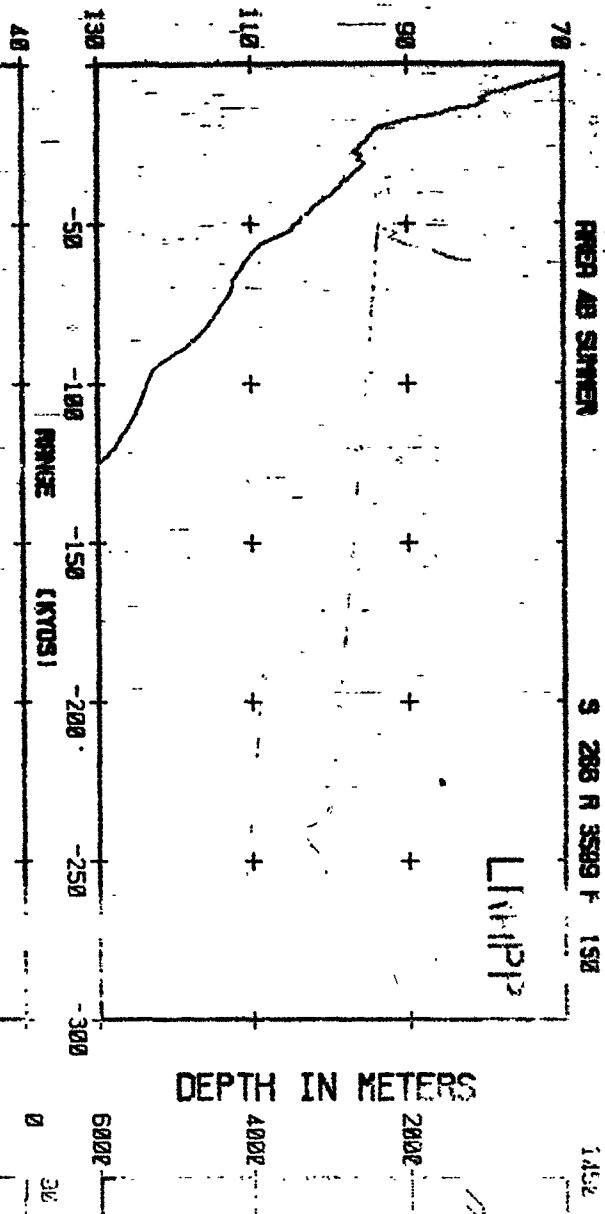
ARRIVAL ANGLE



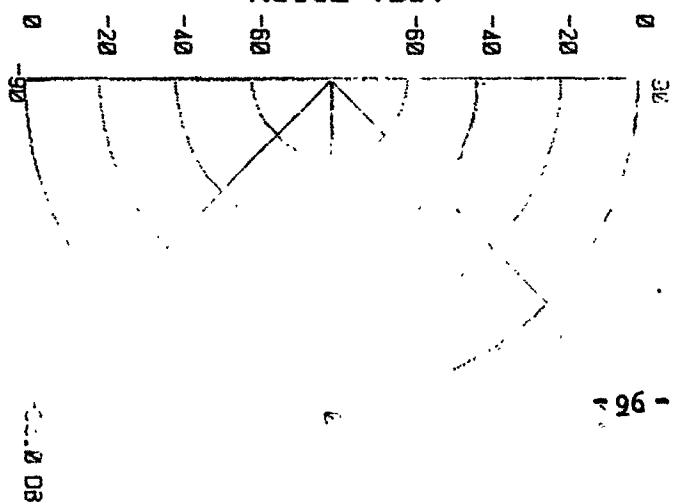
ARRIVAL ANGLE



DB LOSS



NOISE (DB)



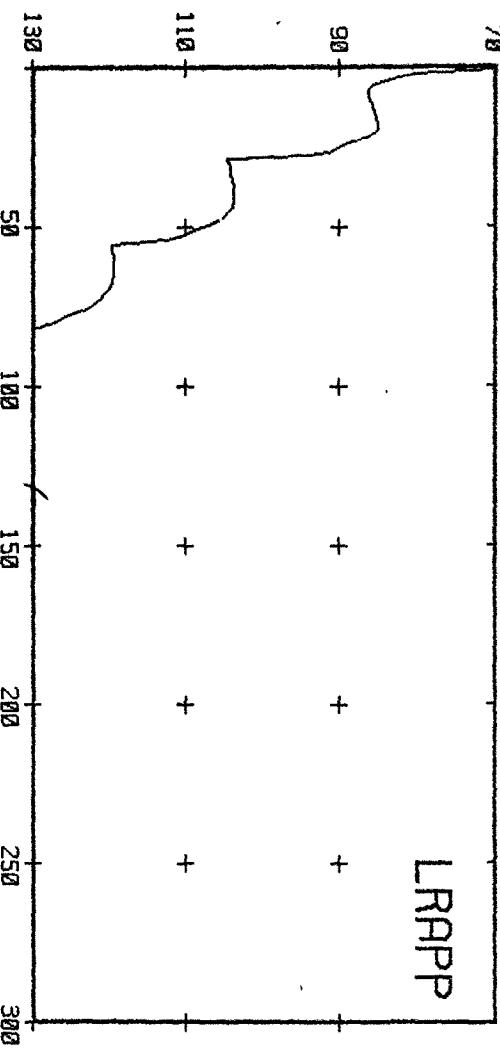
70

ARR AB SUMMER

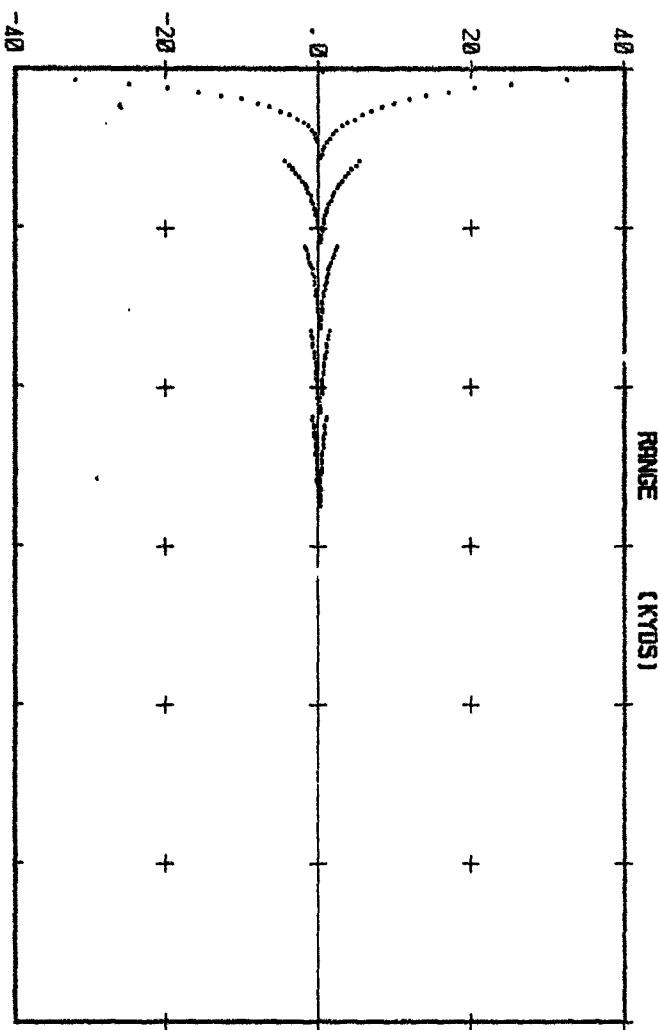
S 20 R 60 F 300

1450 M/S 1500 1550

## DB LOSS

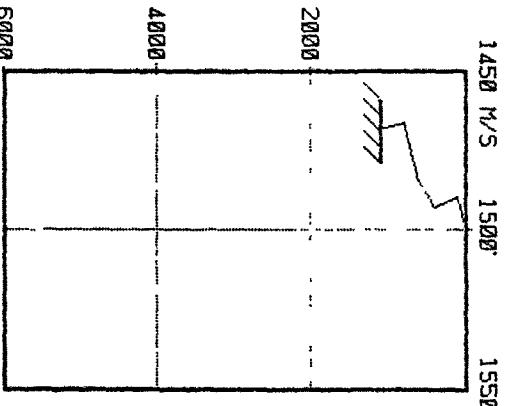


## ARRIVAL ANGLE

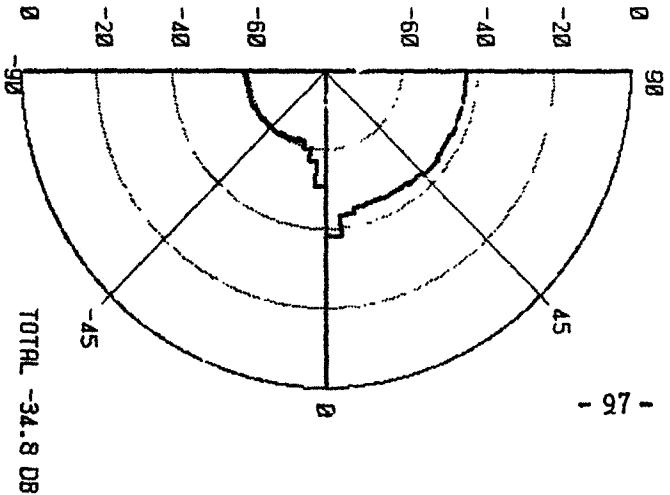


LRAPP

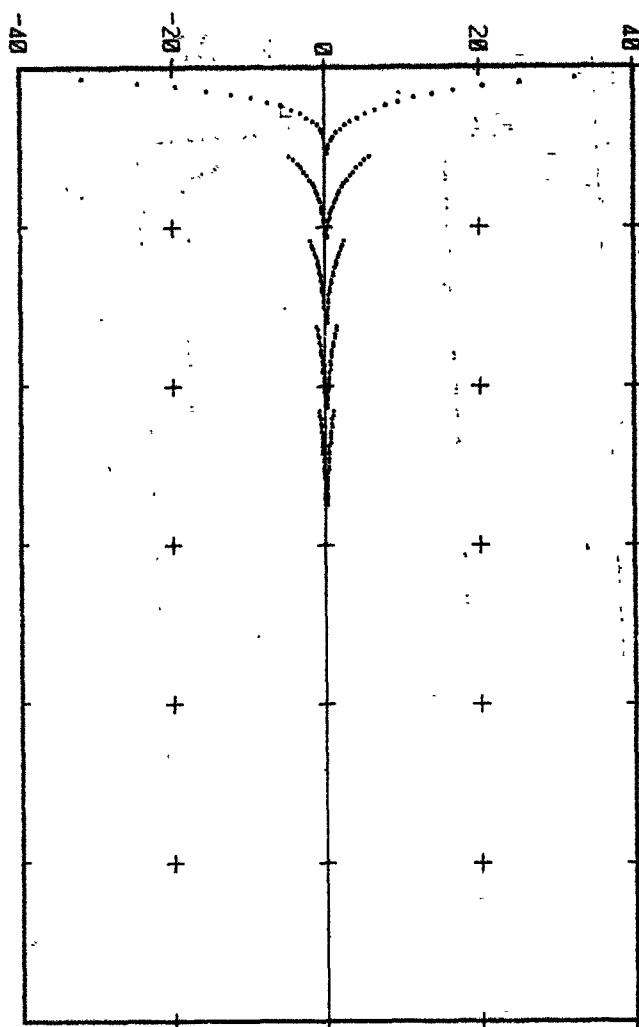
## DEPTH IN METERS



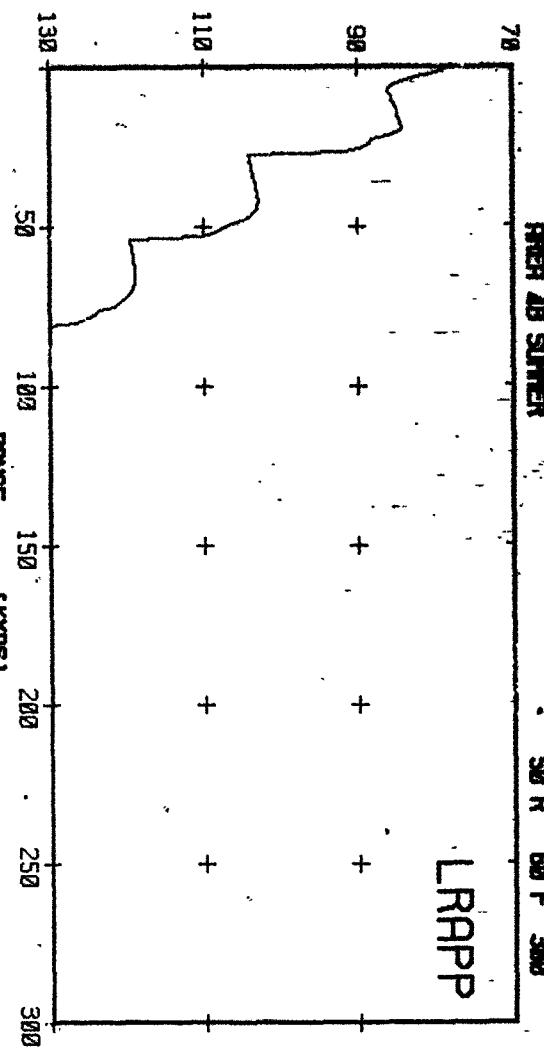
## NOISE (DB)



### ARRIVAL ANGLE



### DB LOSS



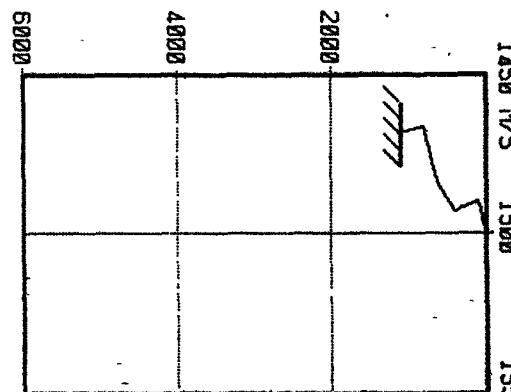
STER 4B SUMMER

50 R 60 F 300

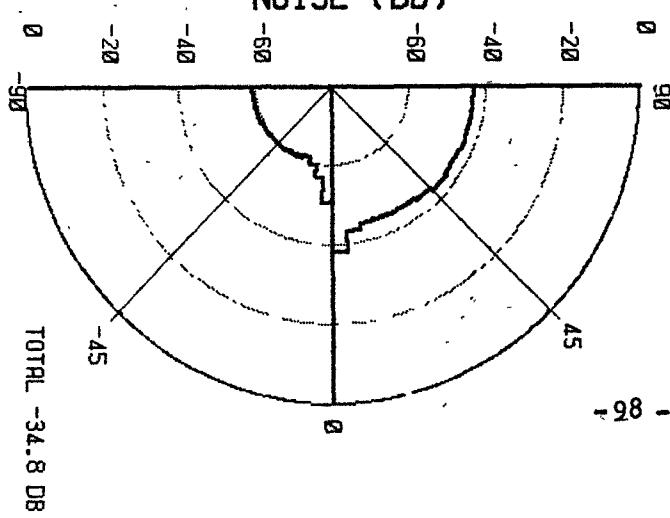
1450 M/S 1500 1550

LRAPP

### DEPTH IN METERS



### NOISE (DB)



-98 -

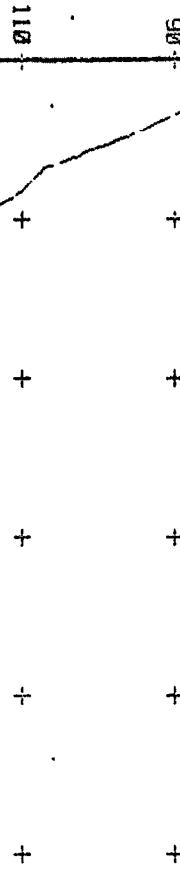
AREA 4B SUMMER

S 268 R 60 F 300

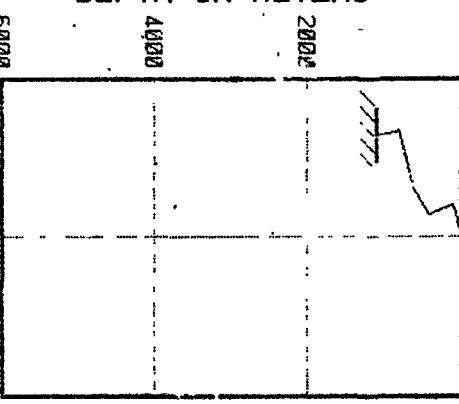
1450 M/S 1500 1550

LRAPP

DB LOSS

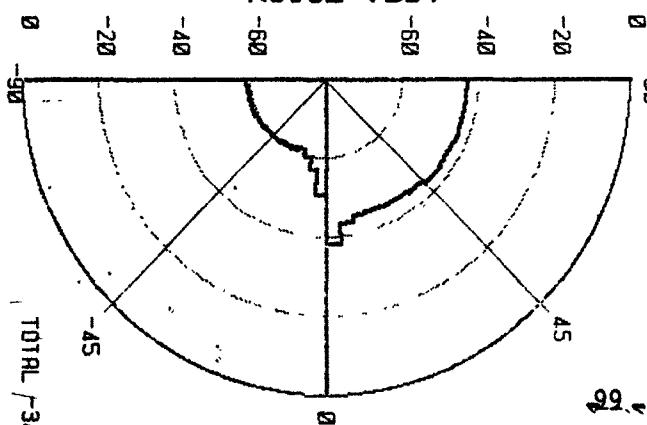
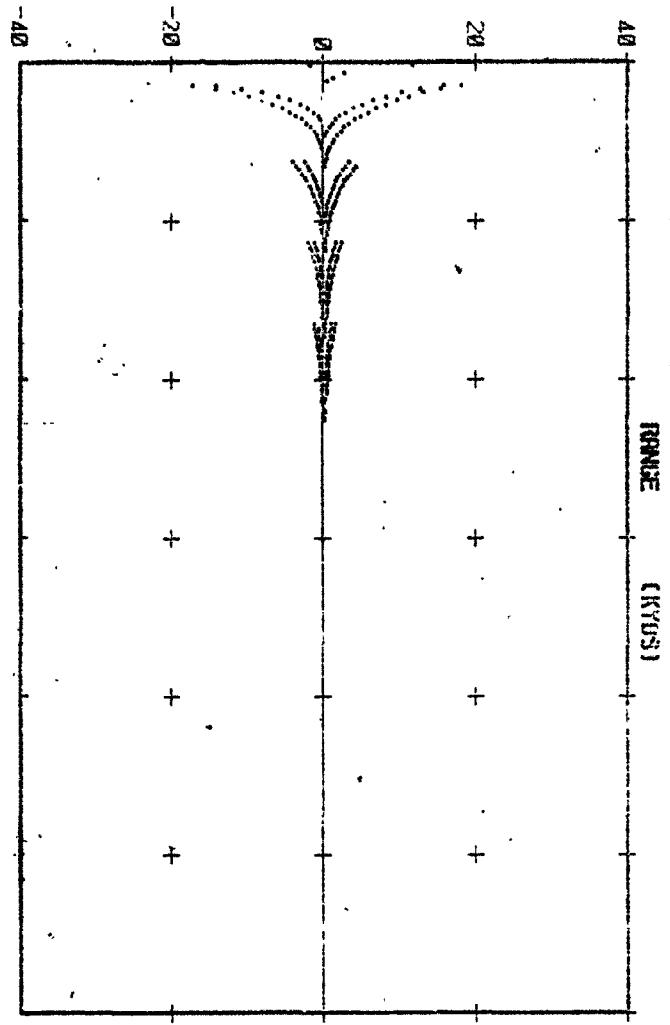


DEPTH IN METERS

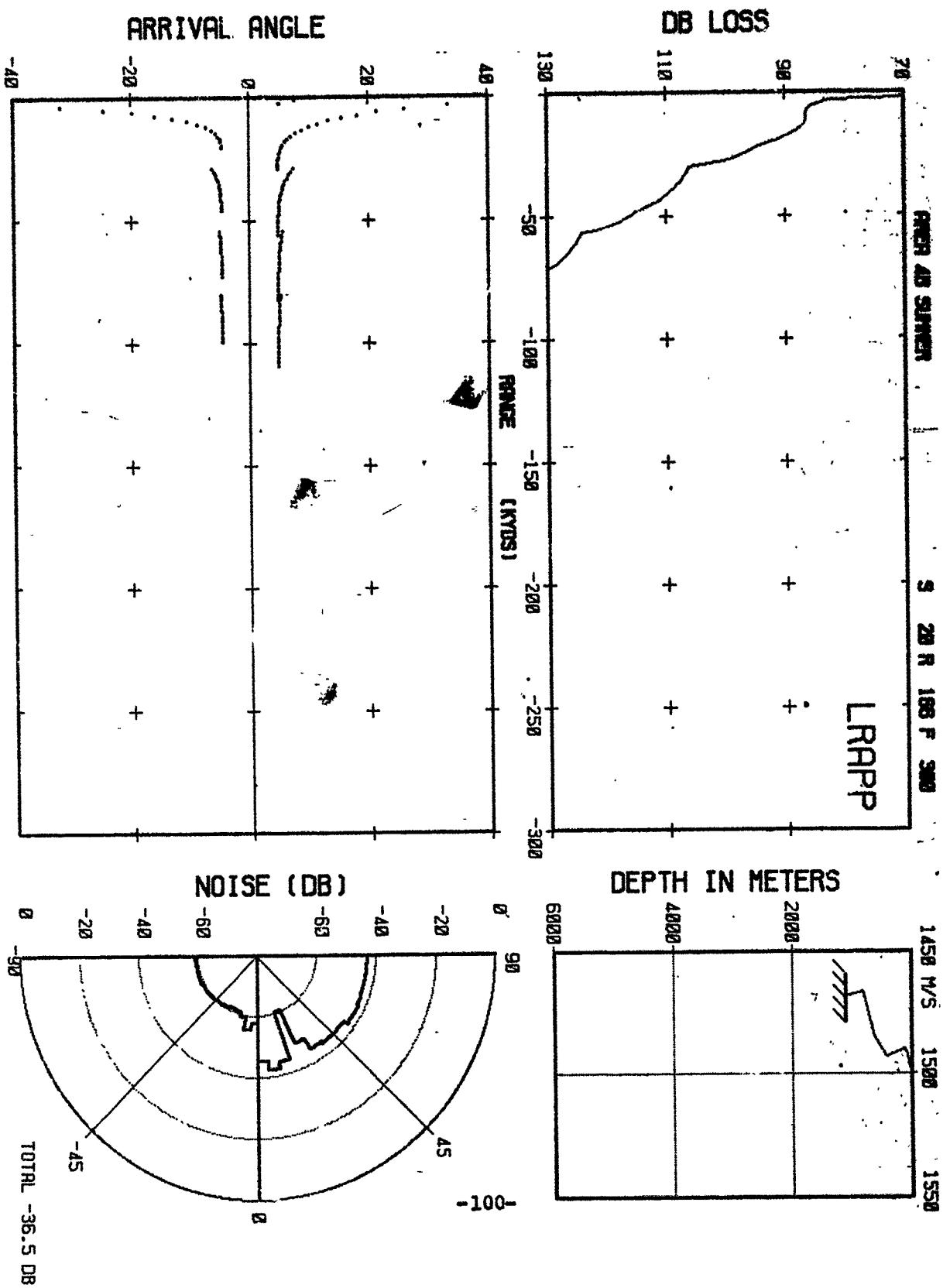


NOISE (DB)

ARRIVAL ANGLE



TOTAL / -34.8 DB



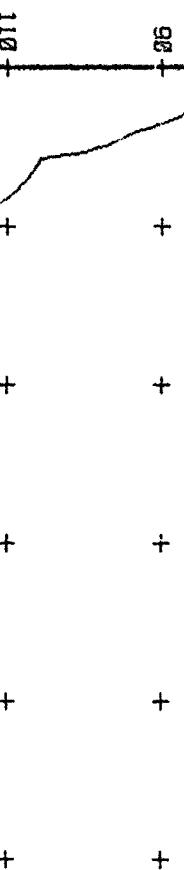
76

AREA AB SUMMER

S 59' R 166 F 300

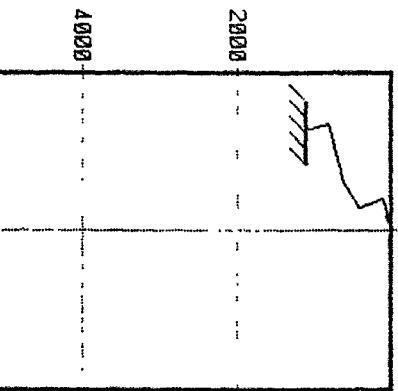
1450 M/S 1500 1550

## DB LOSS

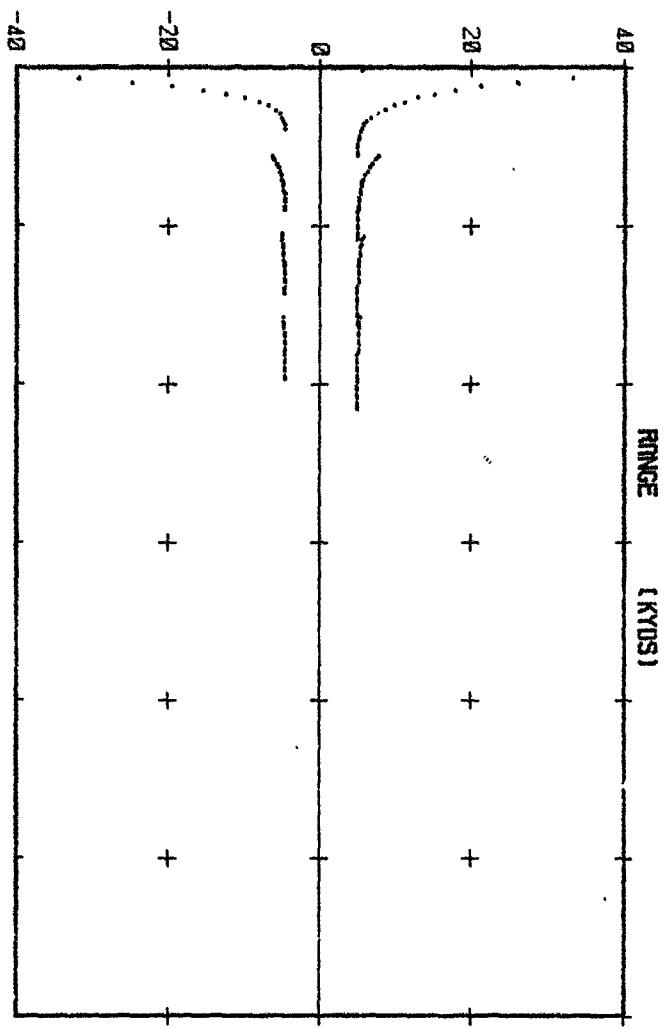


LRAPP

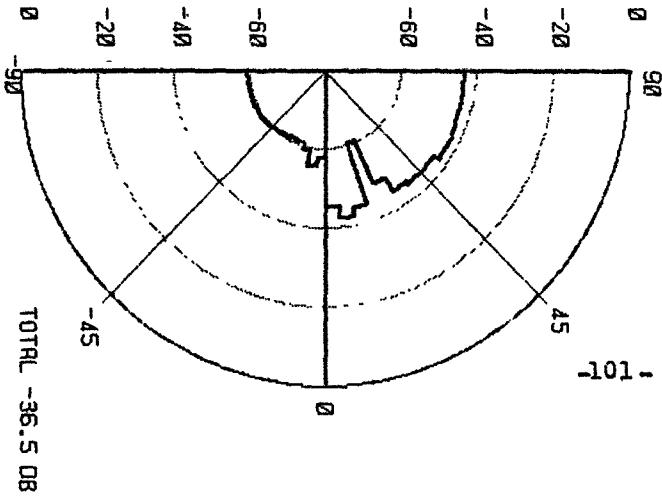
## DEPTH IN METERS

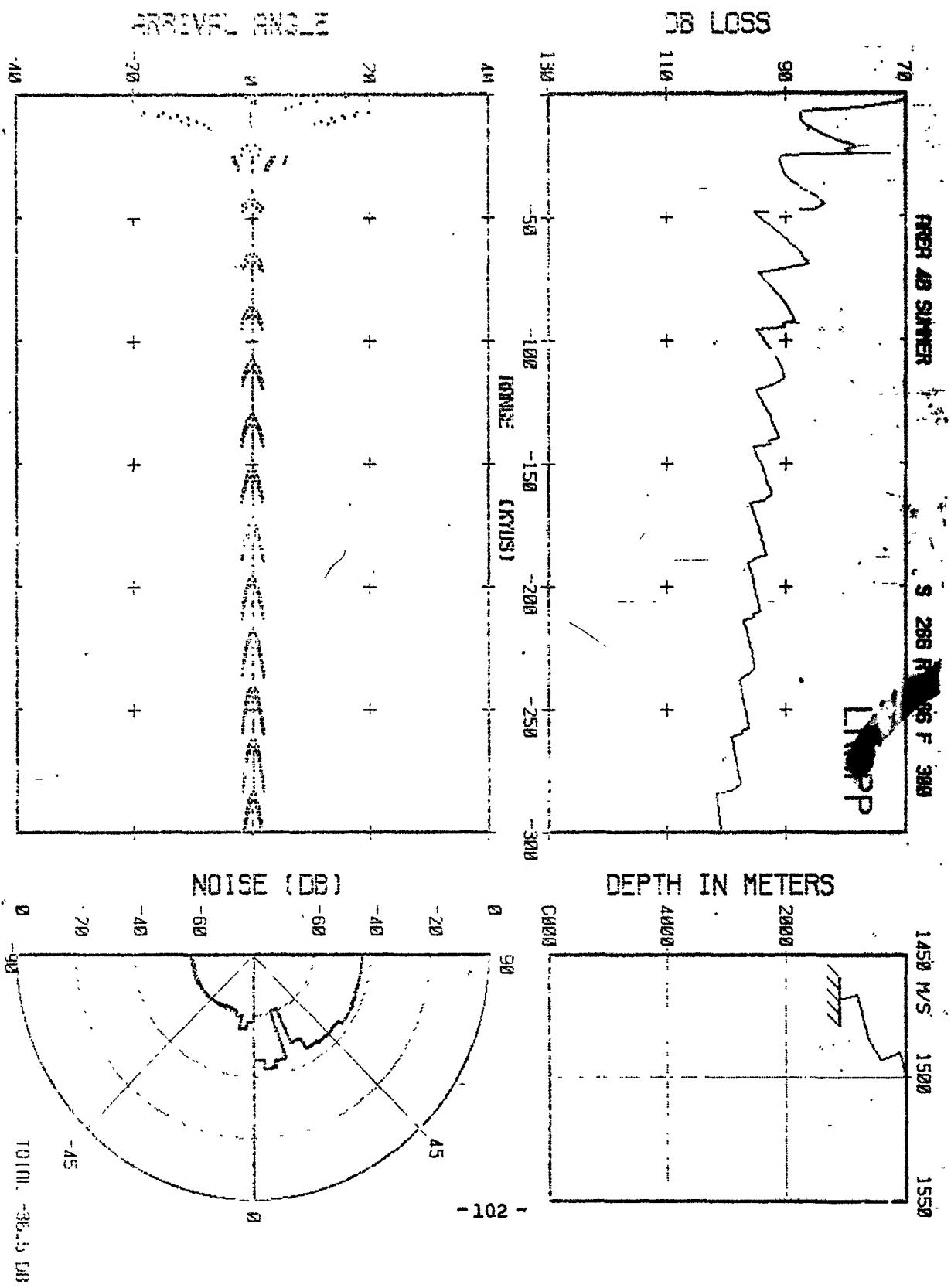


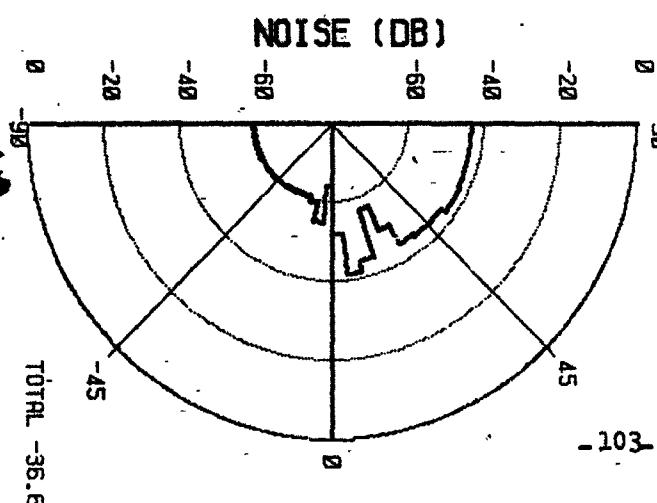
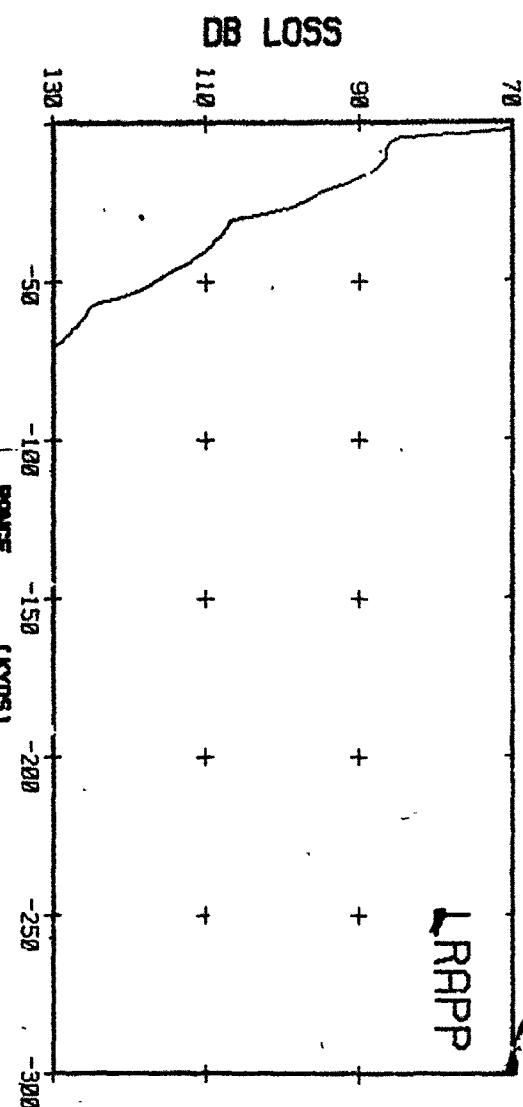
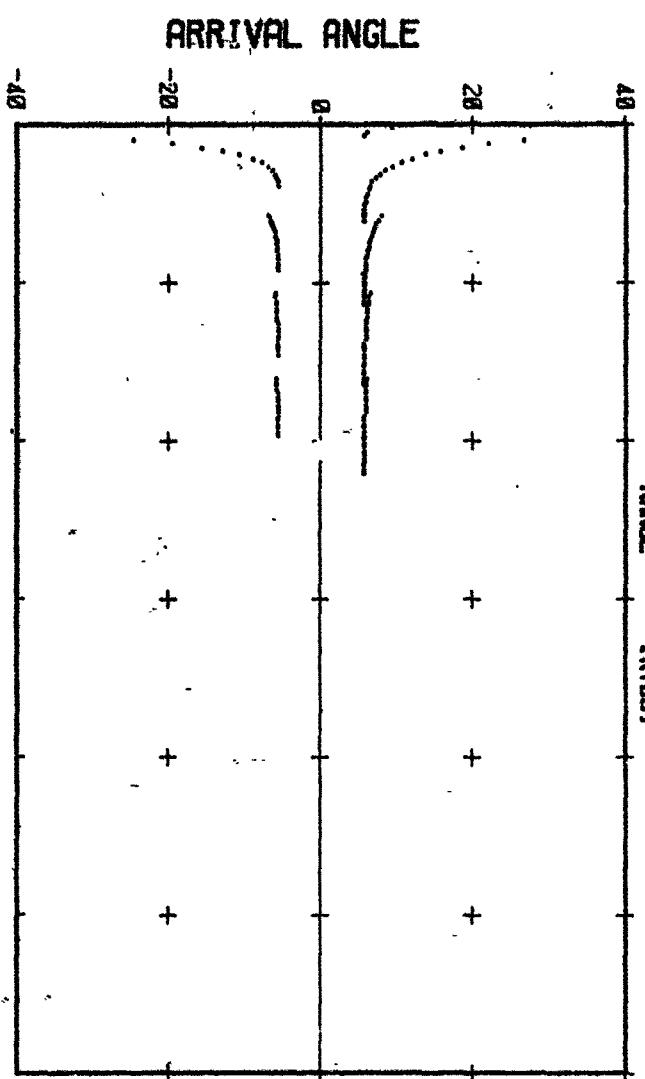
## ARRIVAL ANGLE



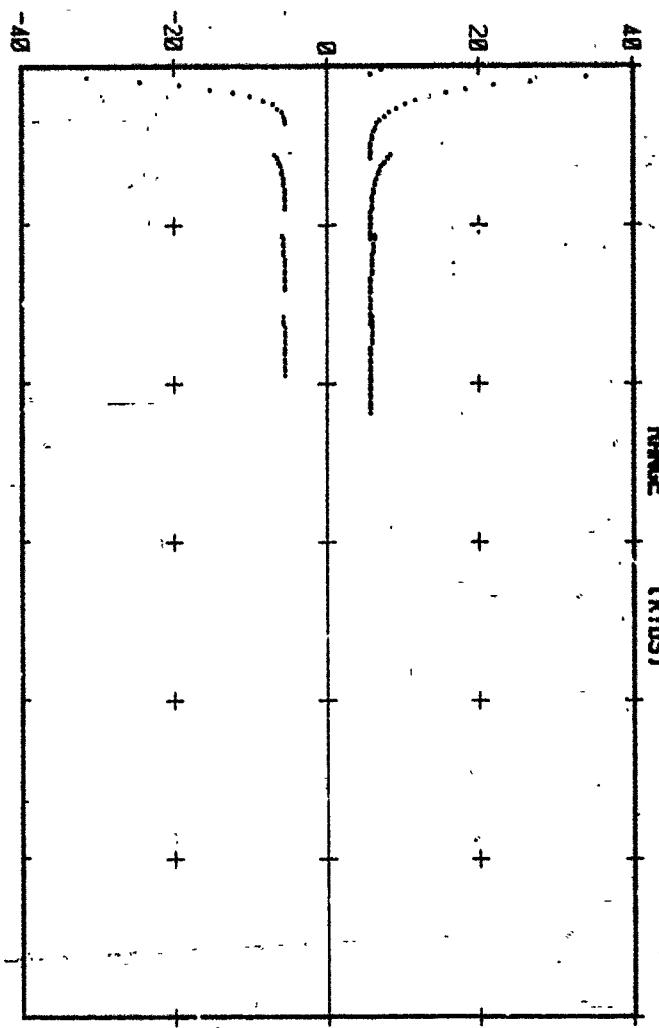
## NOISE (DB)



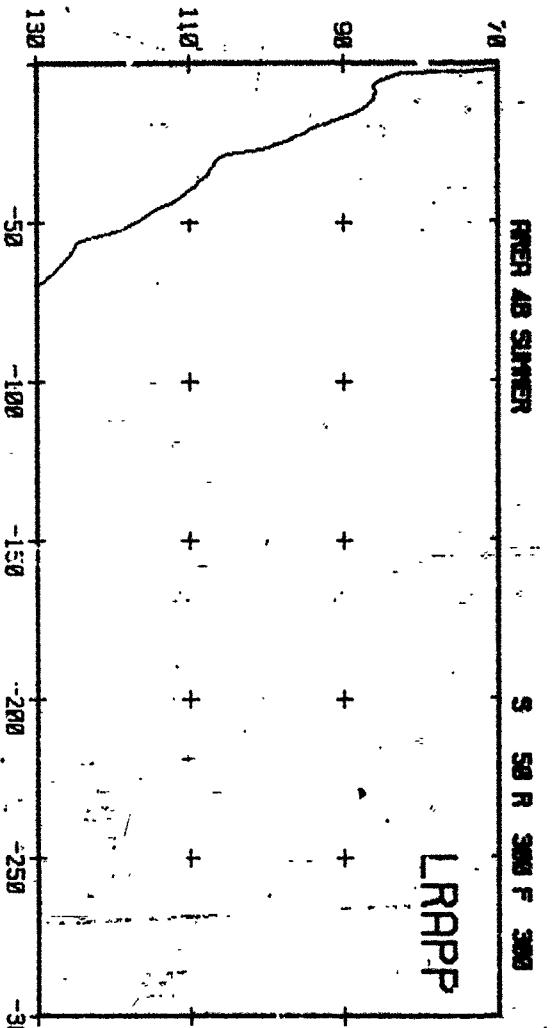




### ARRIVAL ANGLE



### DB LOSS

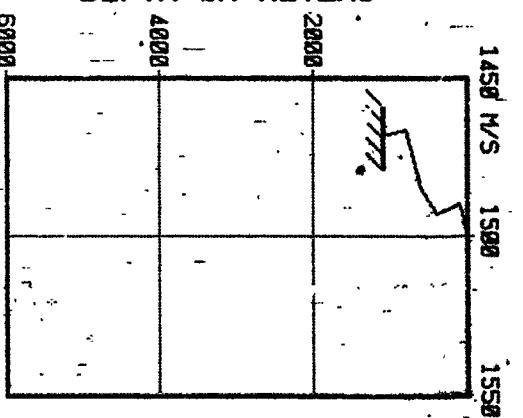


AKER AB SUMMER

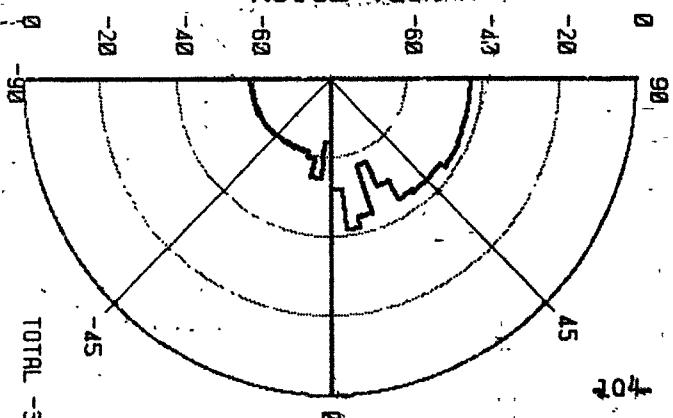
S 59 R 300 F 300

L RAPP

### DEPTH IN METERS



### NOISE (DB)

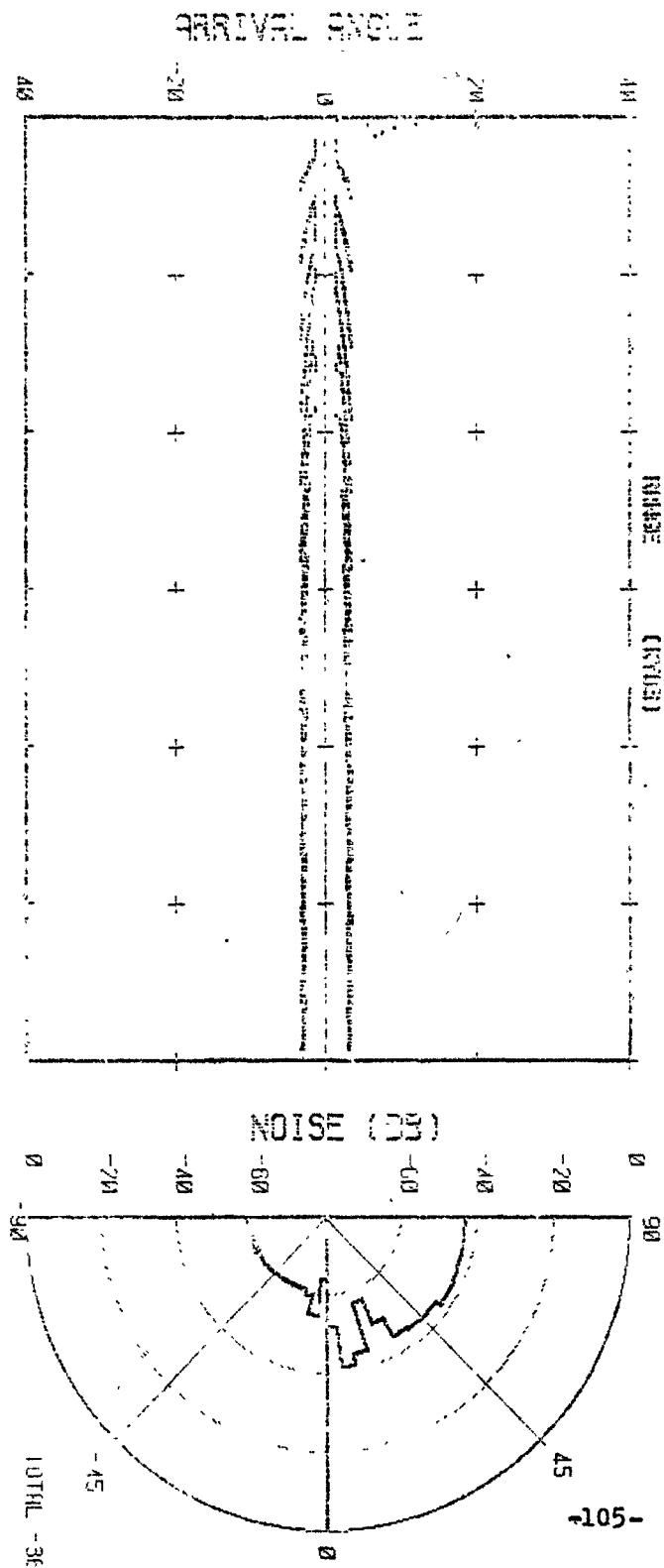
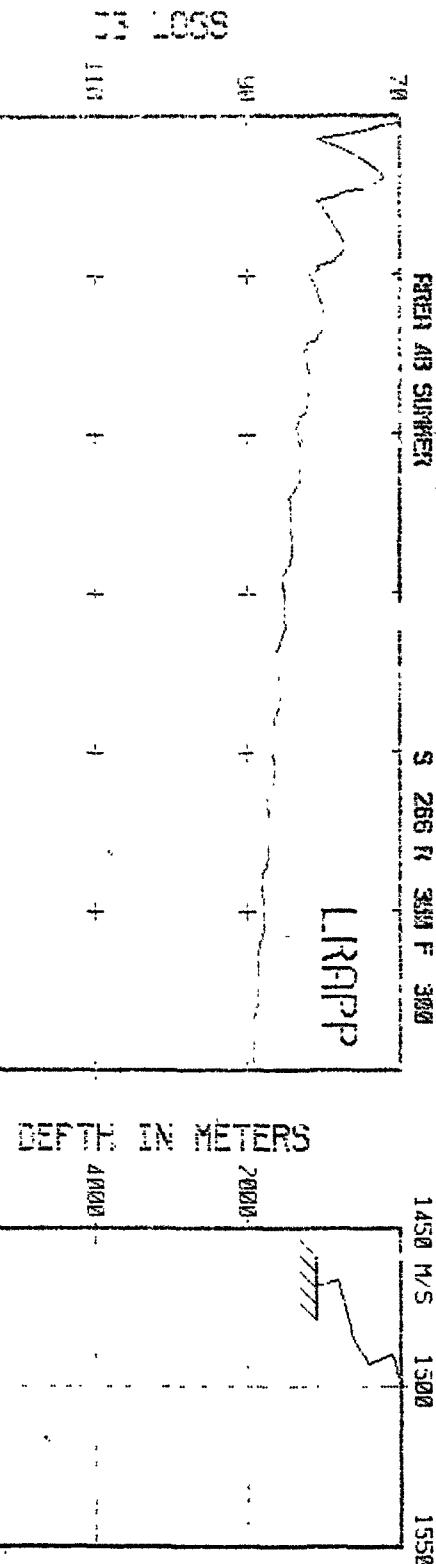


TOTAL -36.6 DB

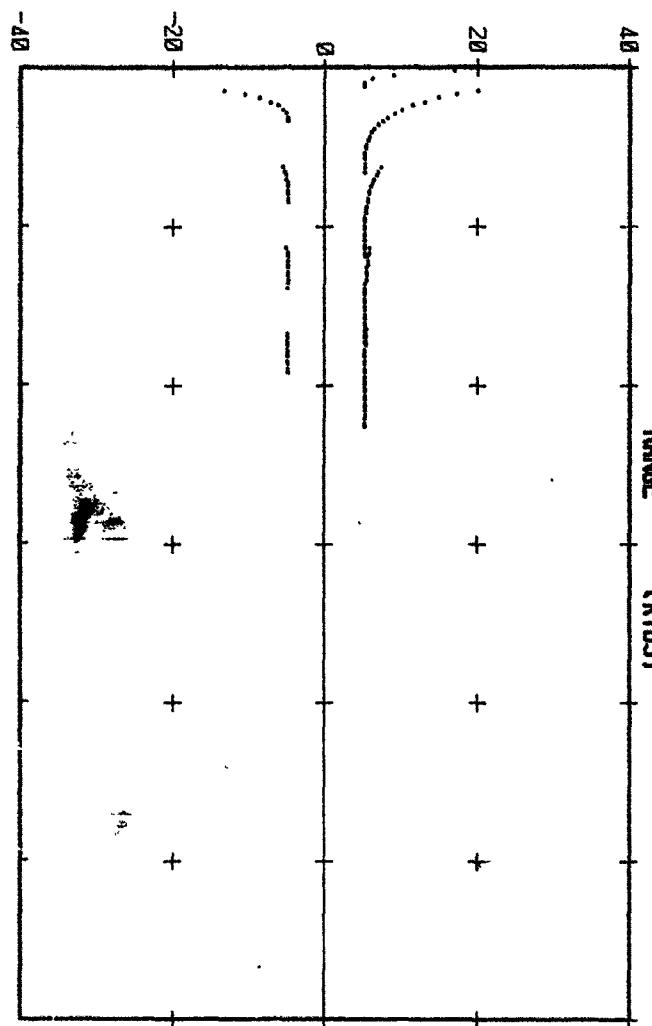
FIREN AB SUMMER

S 266 F 351 F 350

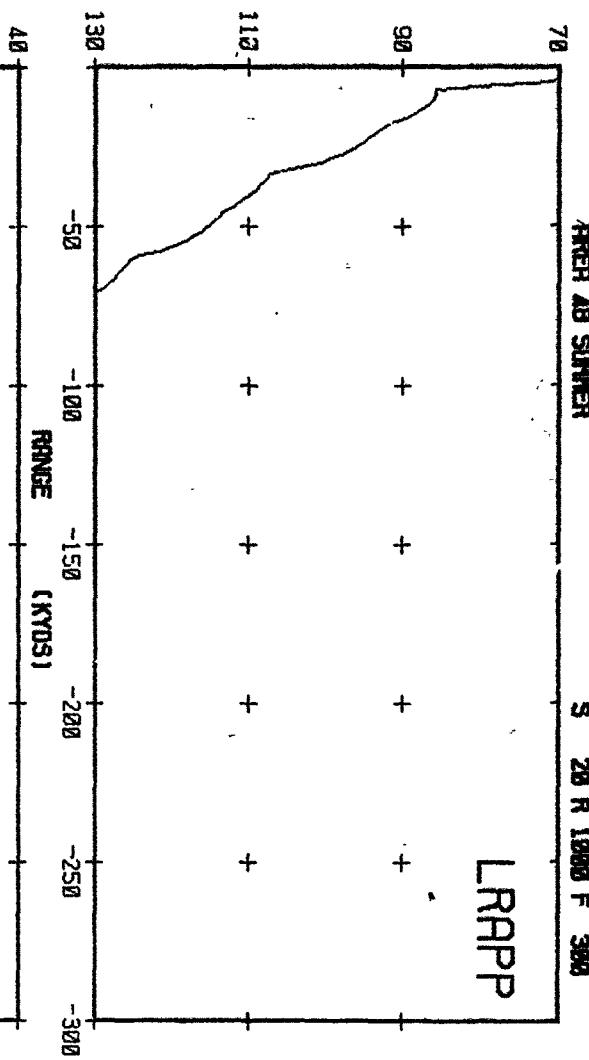
1450 M/S 1500 1550



### ARRIVAL ANGLE

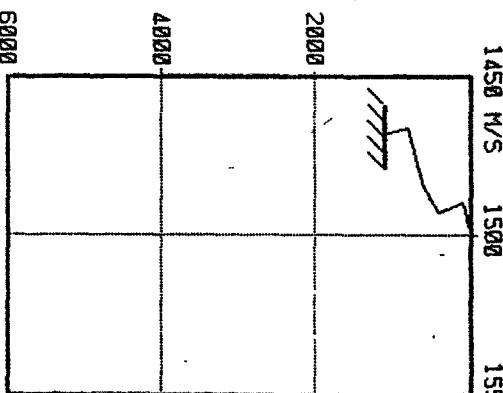


### DB LOSS



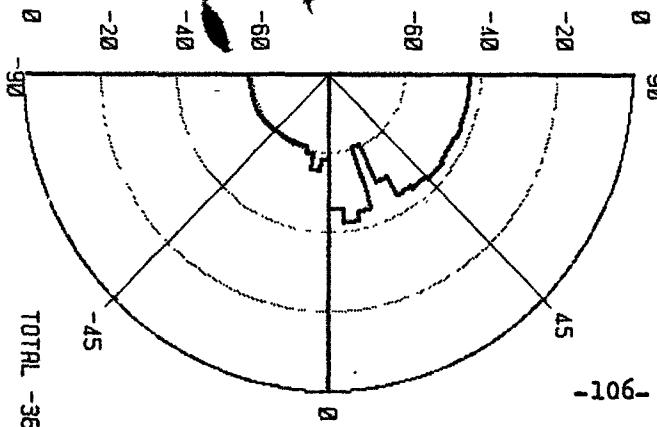
L RAPP

### DEPTH IN METERS



1450 M/S 1500 1550

### NOISE (DB)



-106-

TOTAL -36.5 DB

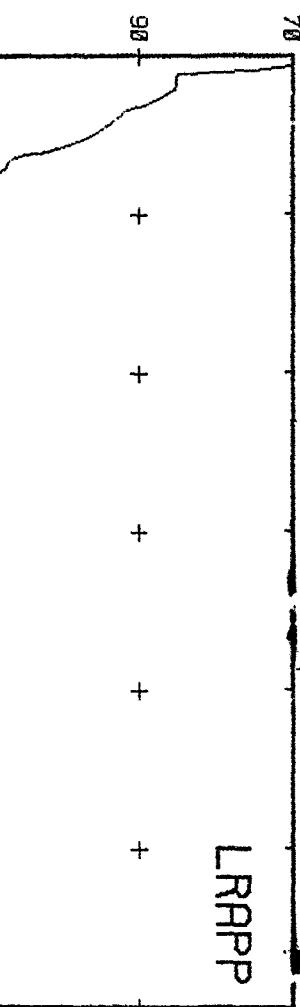
AREA AB SUMMER

R 50 R 1000 F 300

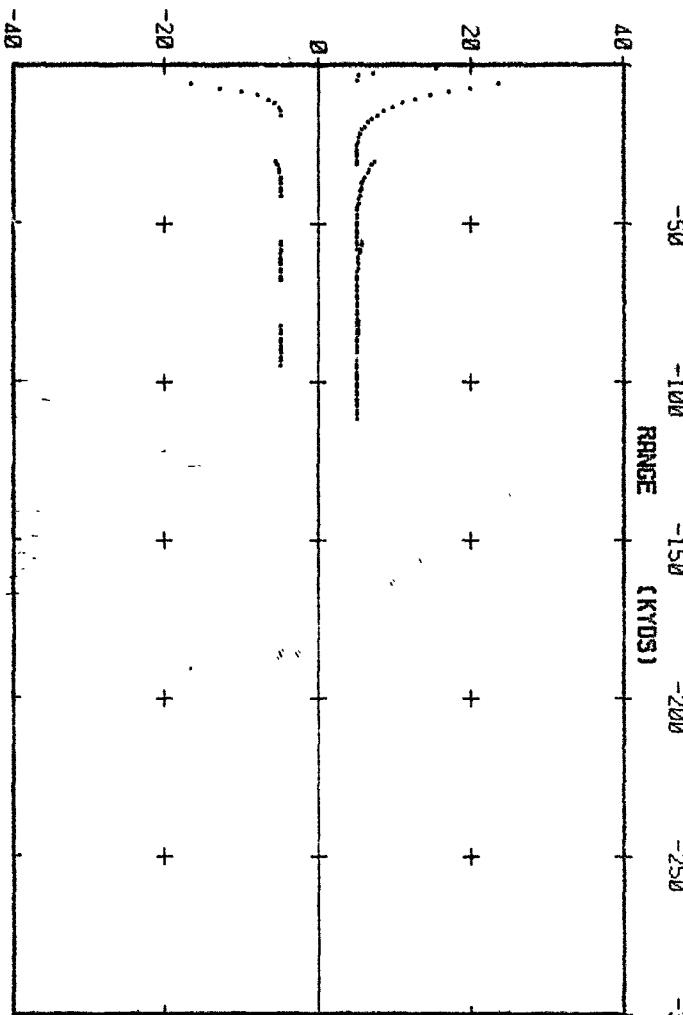
1450 N/S 1500 1550

DB LOSS

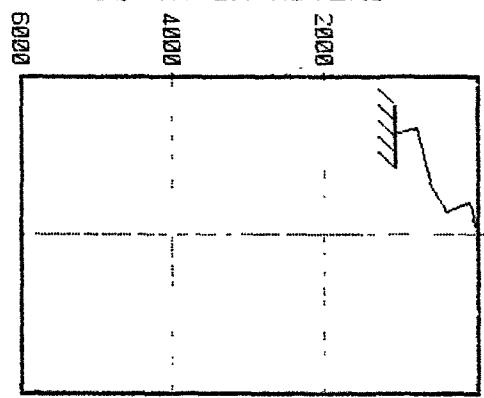
LRAPP



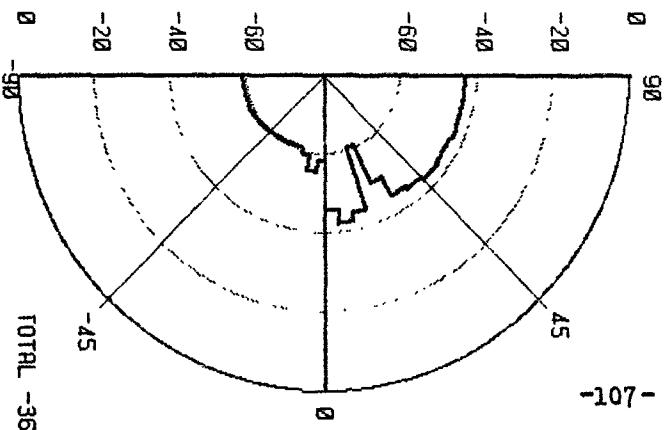
ARRIVAL ANGLE



DEPTH IN METERS



NOISE (DB)



-107-

TOTAL -36.5 DB

70

FREER AB SUMMER

S 266 R 1140 F 320

1450 M/S 1500 1550

DB LOSS

110

100

90

80

70

60

50

40

30

20

10

0

LRAPP

DEPTH IN METERS

2000

4000

6000

8000

10000

12000

14000

16000

18000

20000

22000

24000

26000

28000

30000

32000

34000

36000

ARRIVED ANGLE

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220

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280

300

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460

480

500

520

540

560

580

600

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1780

1800

1820

1840

1860

1880

1900

1920

1940

1960

1980

2000

2020

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2120

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5140

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1430 1435 1530

1430 1435 1530

1430 1435 1530

LRAFP

DB LOSS

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120

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100  
-100  
-150  
-200  
-250  
-300

RANGE (KMS)

ARRIVAL ANGLE

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240

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340

360

380

400

420

440

460

480

500

520

540

560

580

600

DEPTH IN METERS

0

200

400

600

800

1000

1200

1400

1600

1800

2000

2200

2400

2600

2800

3000

3200

3400

3600

3800

4000

4200

4400

4600

4800

5000

5200

5400

5600

5800

6000

6200

6400

6600

6800

7000

7200

7400

7600

7800

8000

8200

8400

8600

8800

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9200

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9600

9800

10000

10200

10400

10600

10800

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11200

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43600

43800

44000

44200

44400

44600

44800

45000

45200

45400

45600

45800

46000

46200

70

ARRER AB SUMMER

S 59 R 1312 F 300

1450 M/S 1500 1550

## DB LOSS

90

110

+ + + + +

+ + + + +

+ + + + +

+ + + + +

+ + + + +

+ + + + +

+ + + + +

LRAPP

130  
40  
-50 -100 -150 -200 -250 -300

RANGE (KTS)

## DEPTH IN METERS

2000  
4000

0

6000

8000

10000

12000

## ARRIVAL ANGLE

-40

-20

0

20

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80

100

120

140

160

180

200

220

240

260

280

300

320

340

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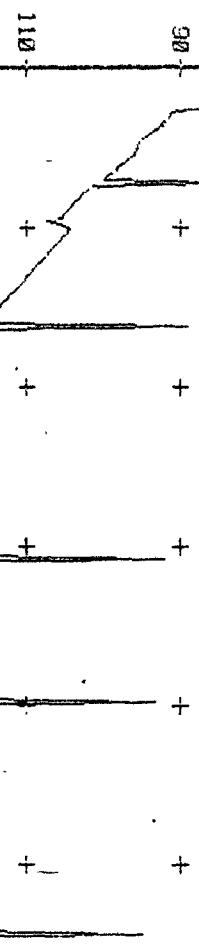
FILTER AB SUMMER

S 268 R 1312 F 300

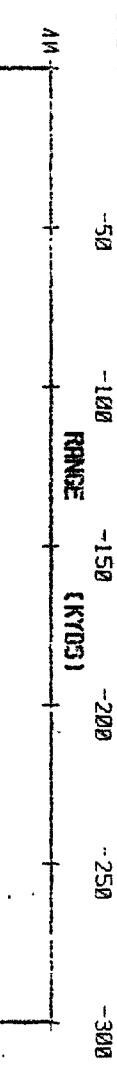
1450 N/S 1500 1550

LRAPP

DB LOSS

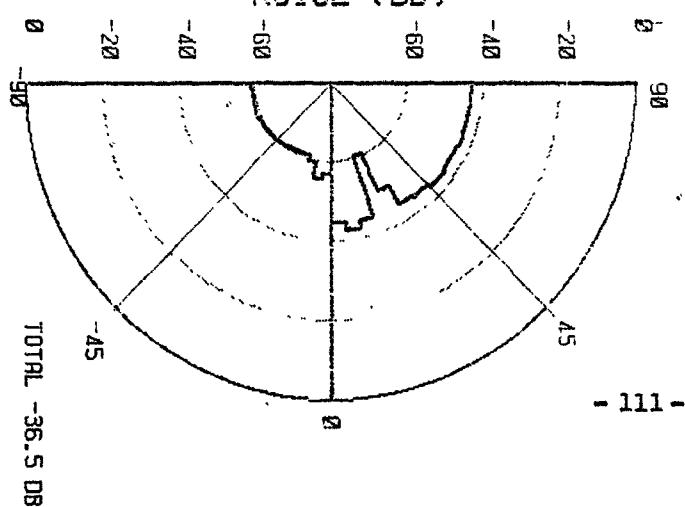


DEPTH IN METERS

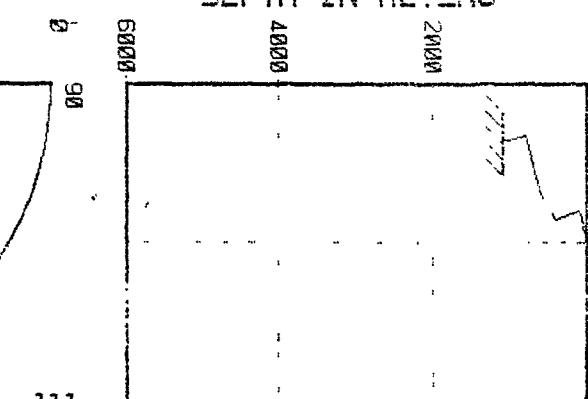


ARRIVAL ANGLE

NOISE (DB)



TOTAL -35.5 DB

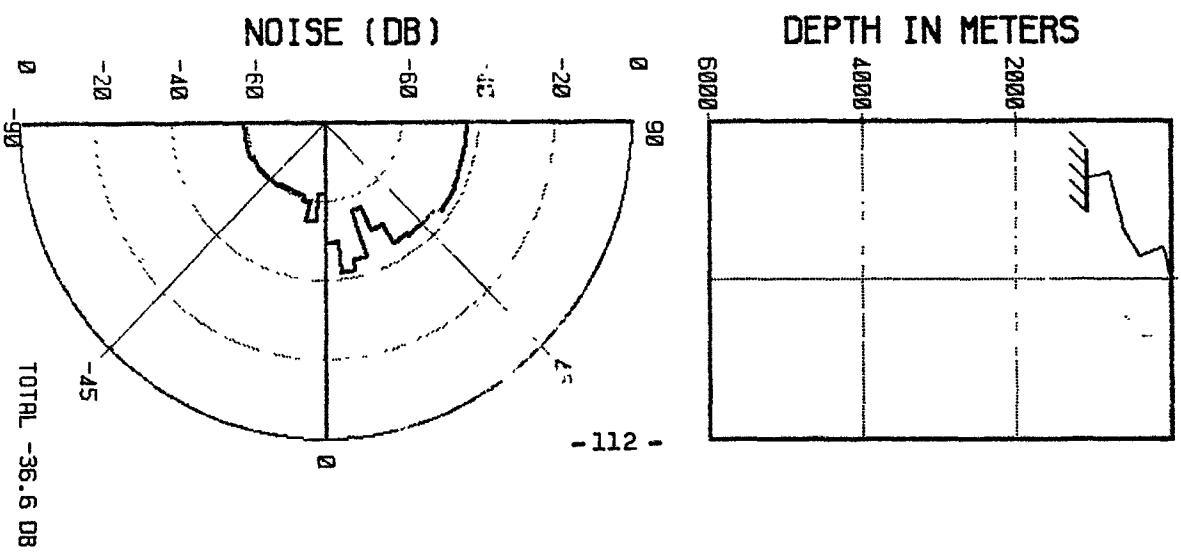
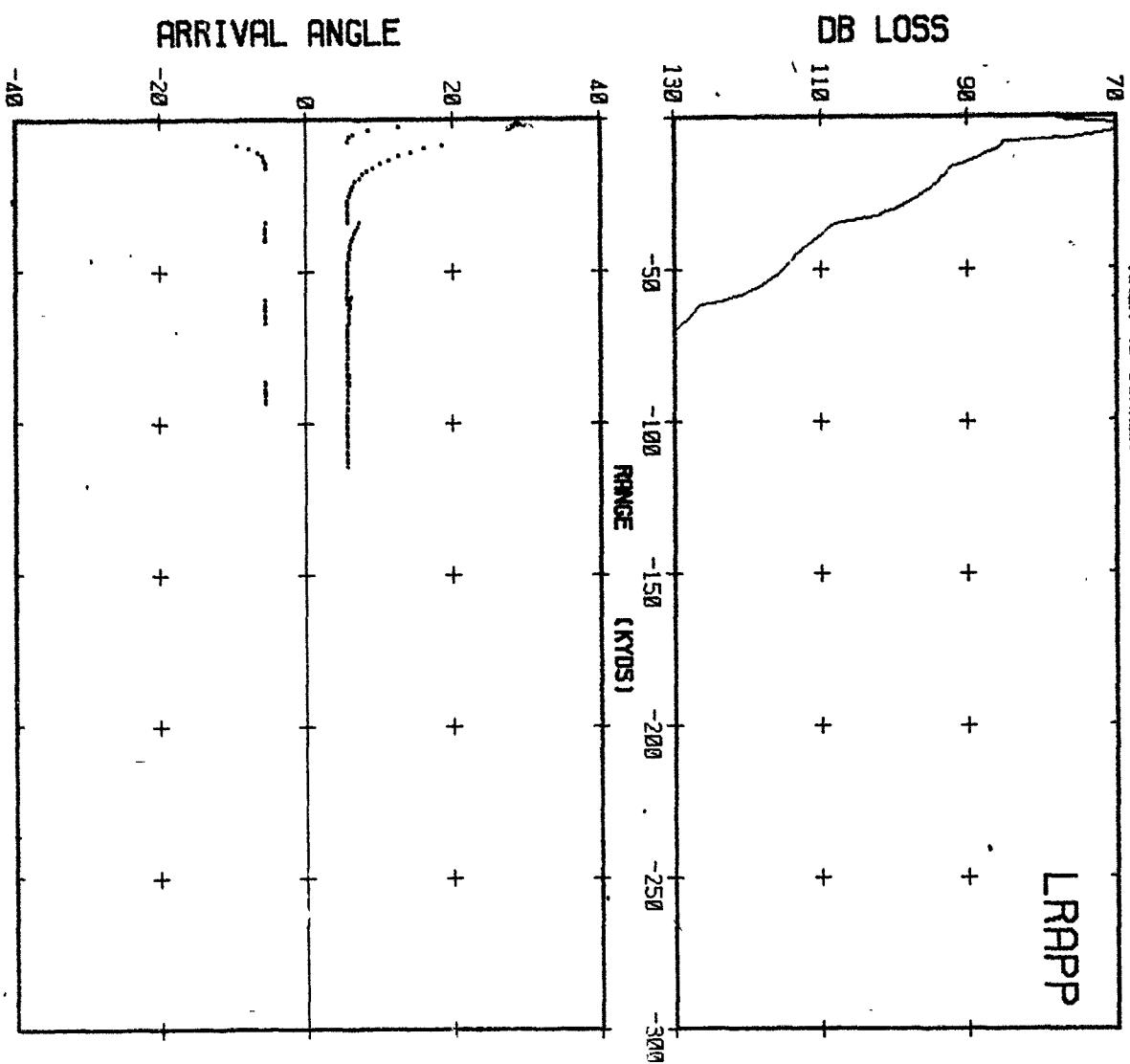


-111-

卷之三

5 28 R 1503 F

1450 M/S      1500      1550

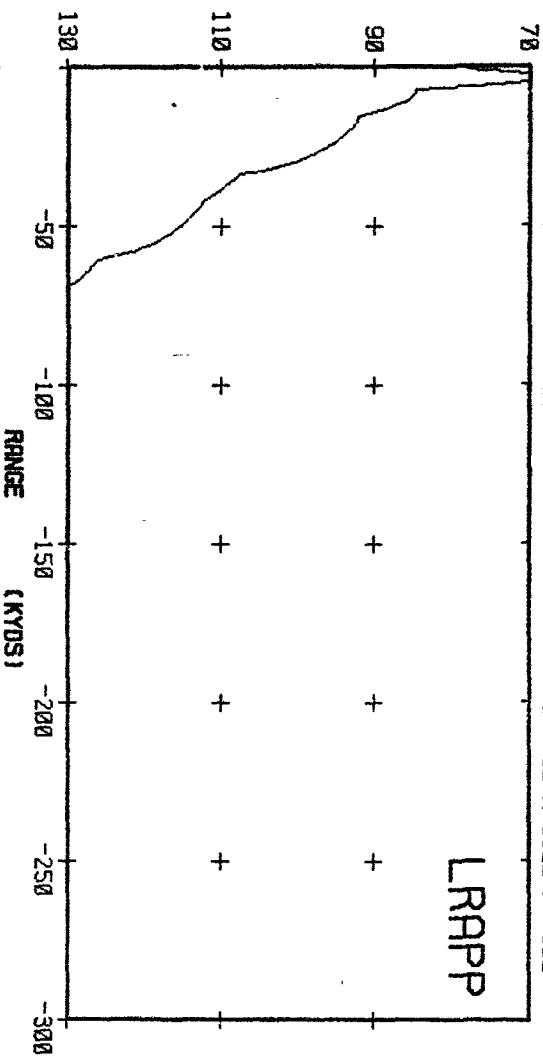


AREA 4B SUMMER

S 50 R 1500 F 300

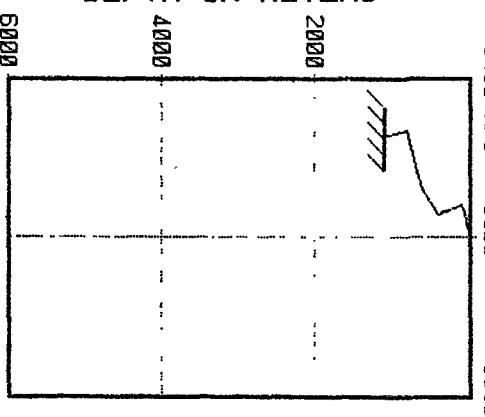
1450 M/S 1500 1550

DB LOSS

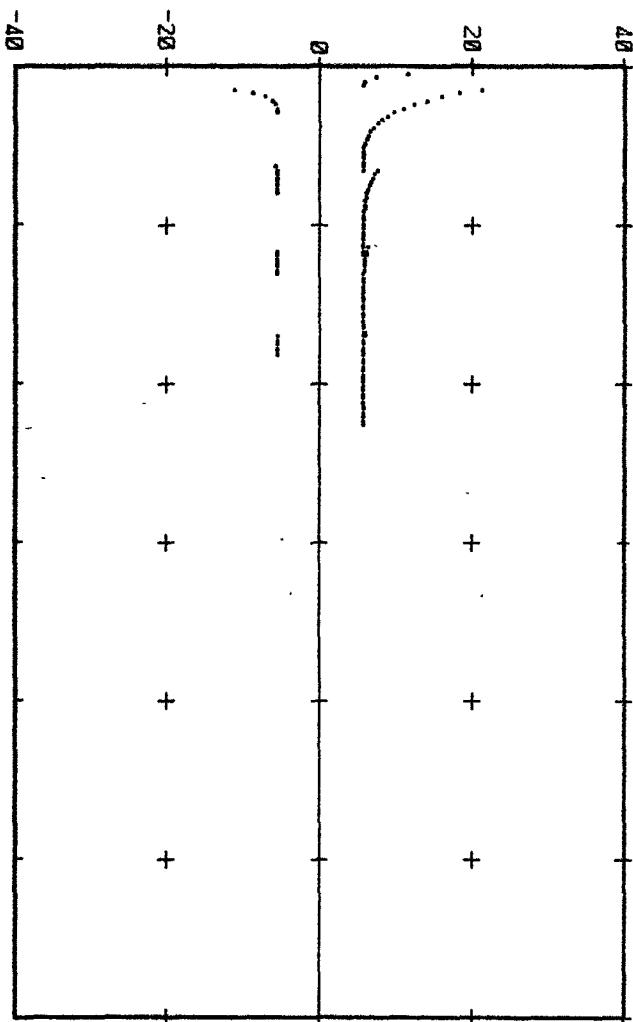


LRAPP

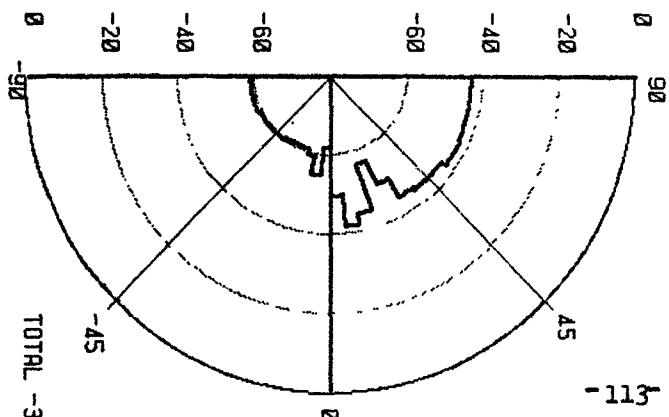
DEPTH IN METERS

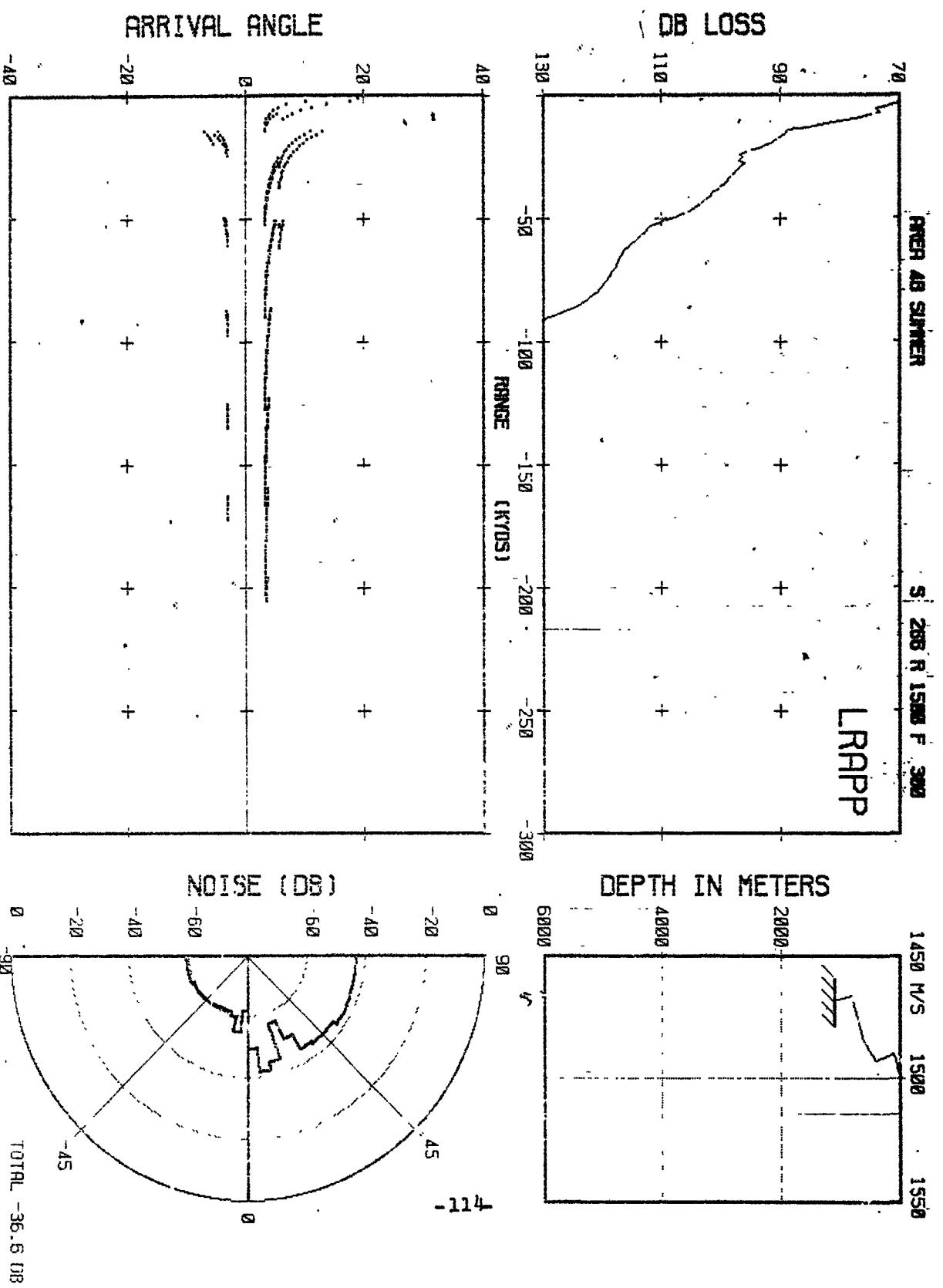


ARRIVAL ANGLE



NOISE (DB)





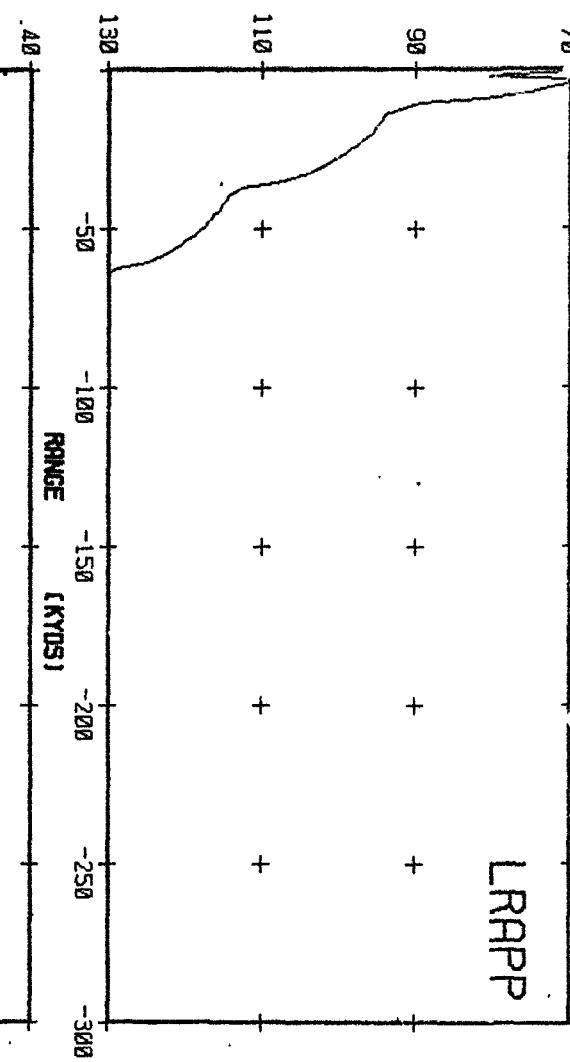
AREA 4B SUMMER

3 20 R 2625 F 300

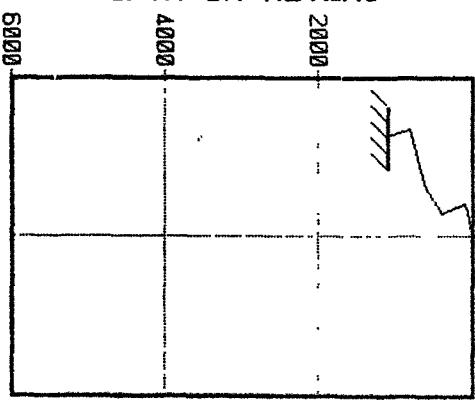
1450 M/S 1500 1550

LRAPP

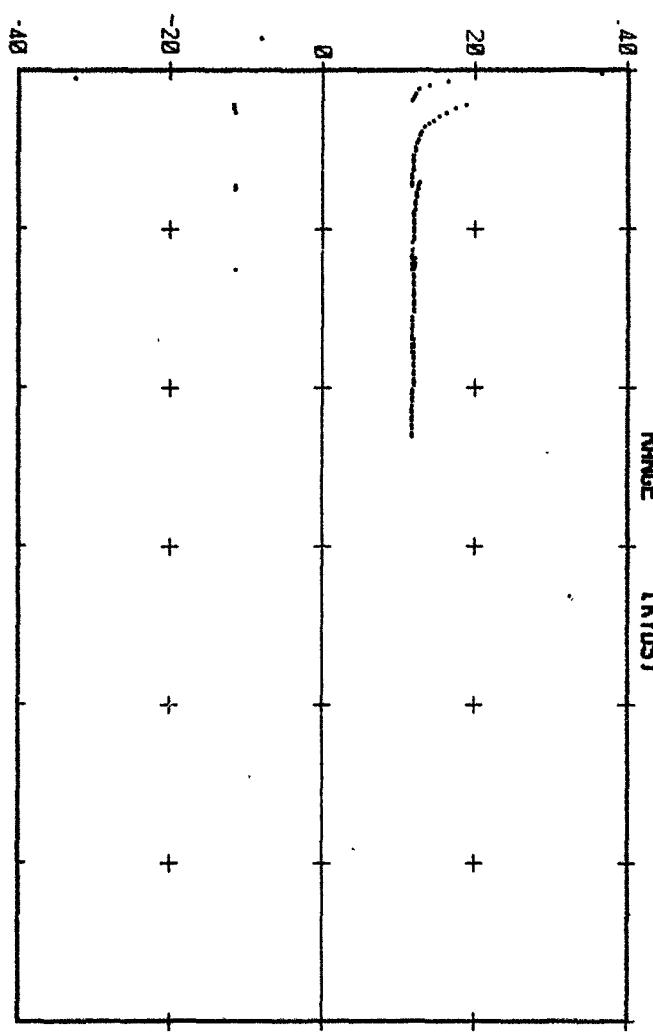
DB LOSS



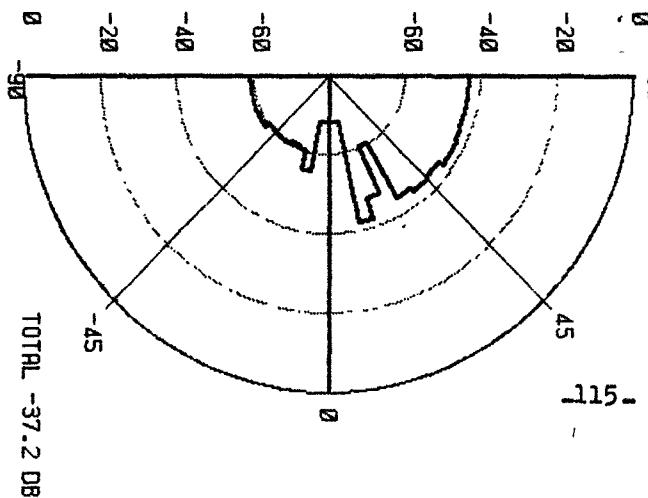
DEPTH IN METERS



ARRIVAL ANGLE



NOISE (DB)



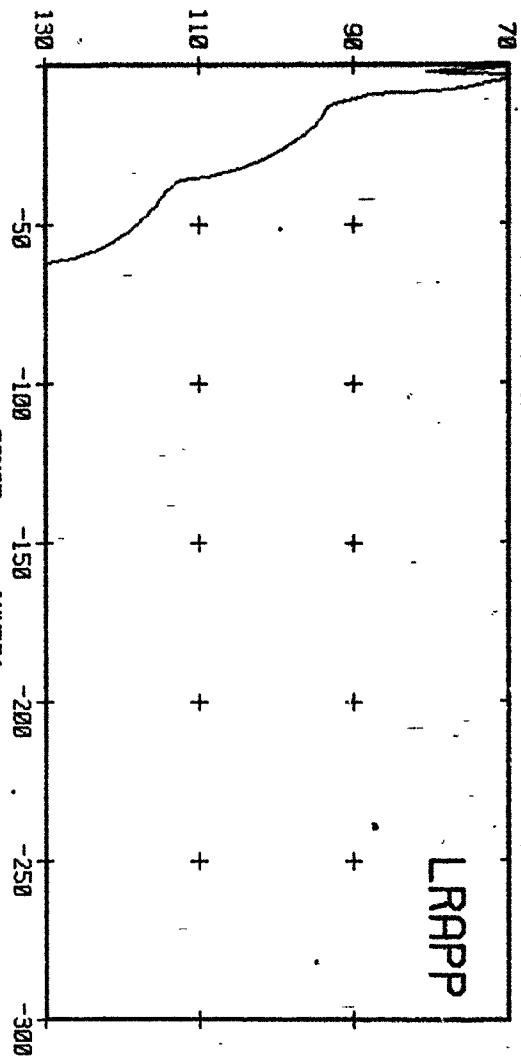
78

AKER AB SUMMER

S 58 R 2625 F 300

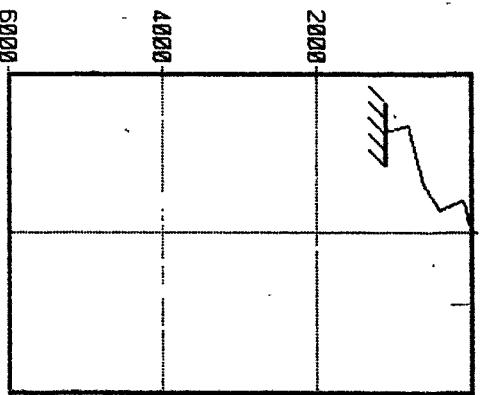
1450 M/S 1500 1550

## DB LOSS

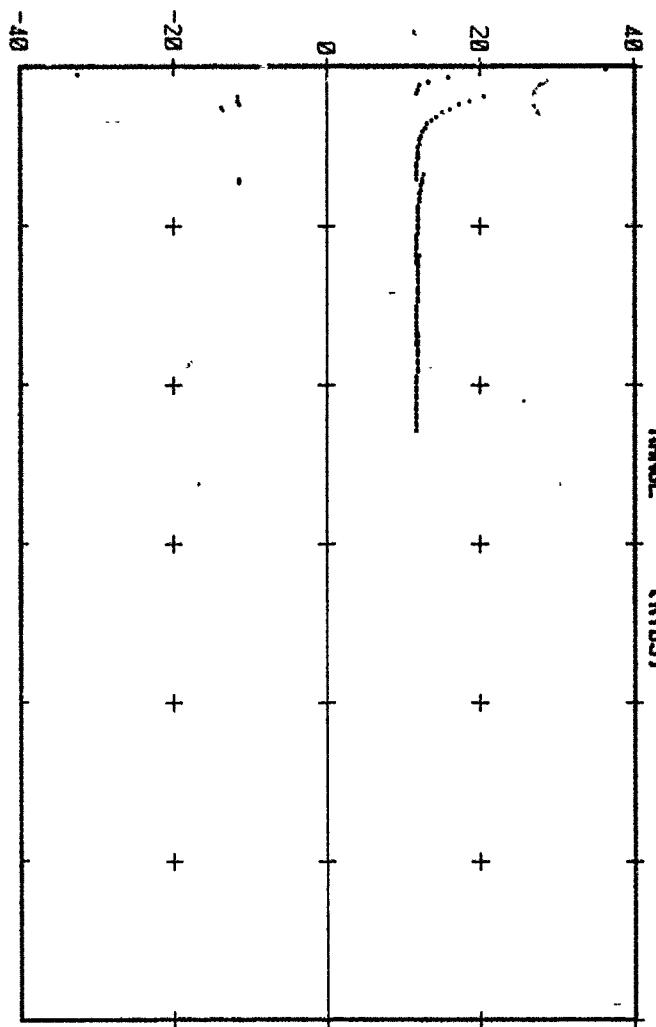


LRAPP

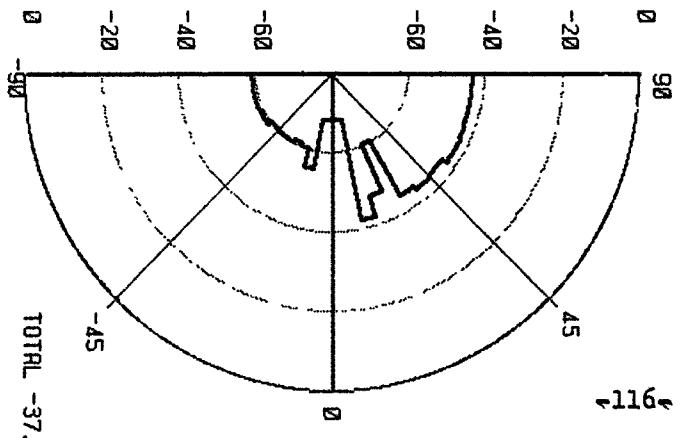
## DEPTH IN METERS



## ARRIVAL ANGLE



## NOISE (DB)



TOTAL -37.2 DB

70

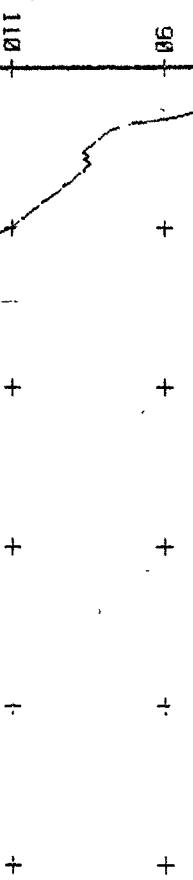
HHR 4B SUMMER

S 266 R 2625 F 360

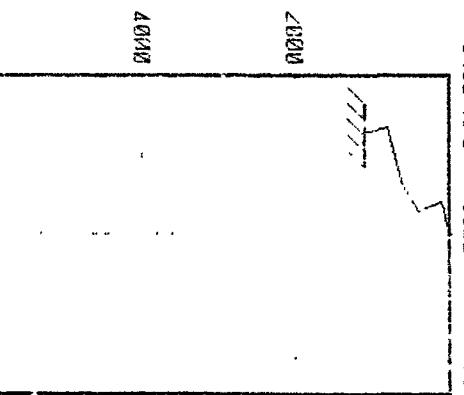
1450 M/S 1500 1550

LRAPP

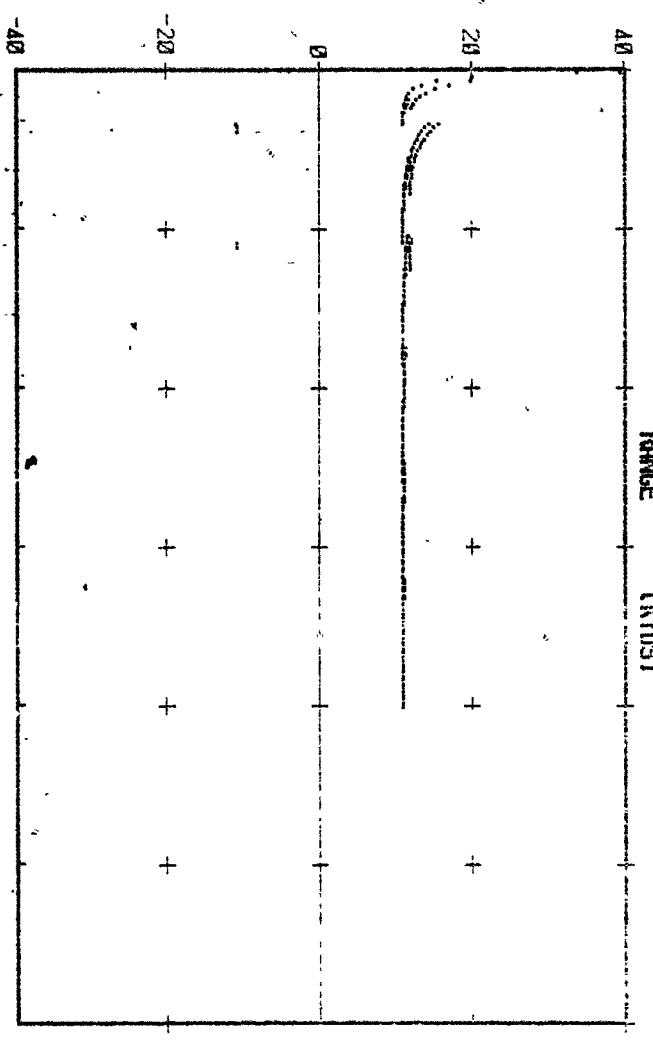
## DB LOSS



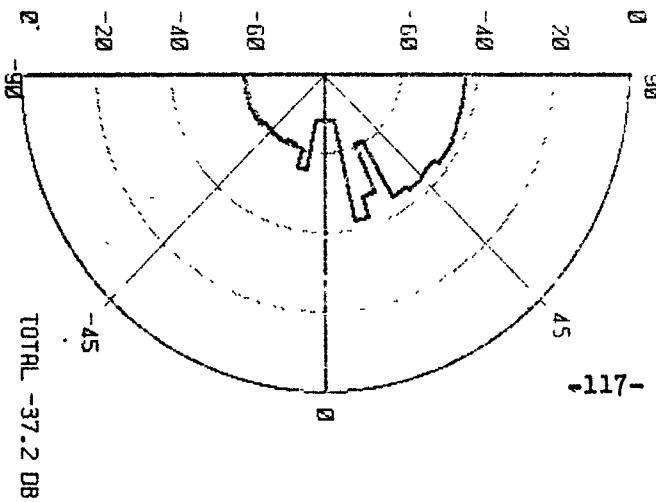
## DEPTH IN METERS



## ARRIVAL ANGLE



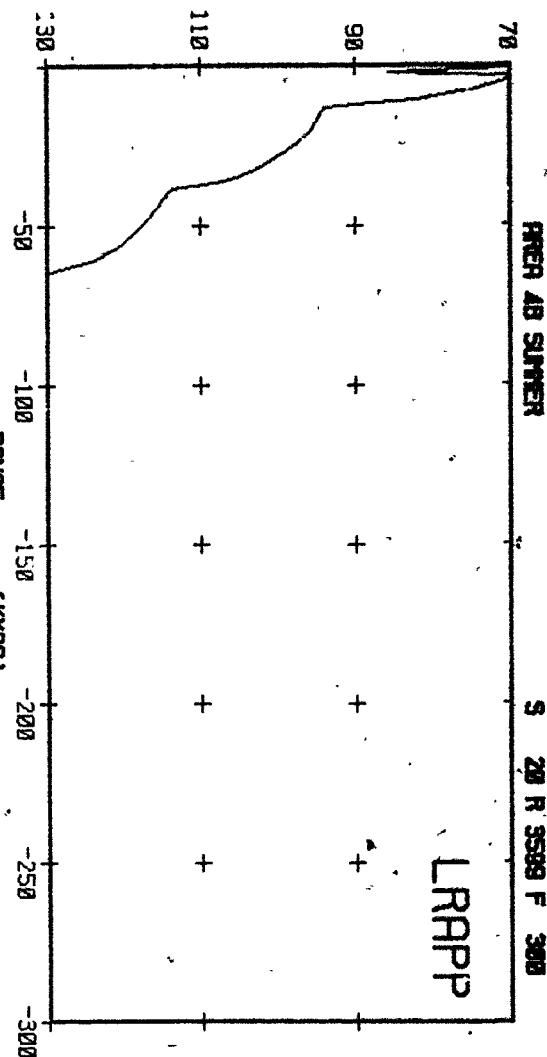
## NOISE (dB)



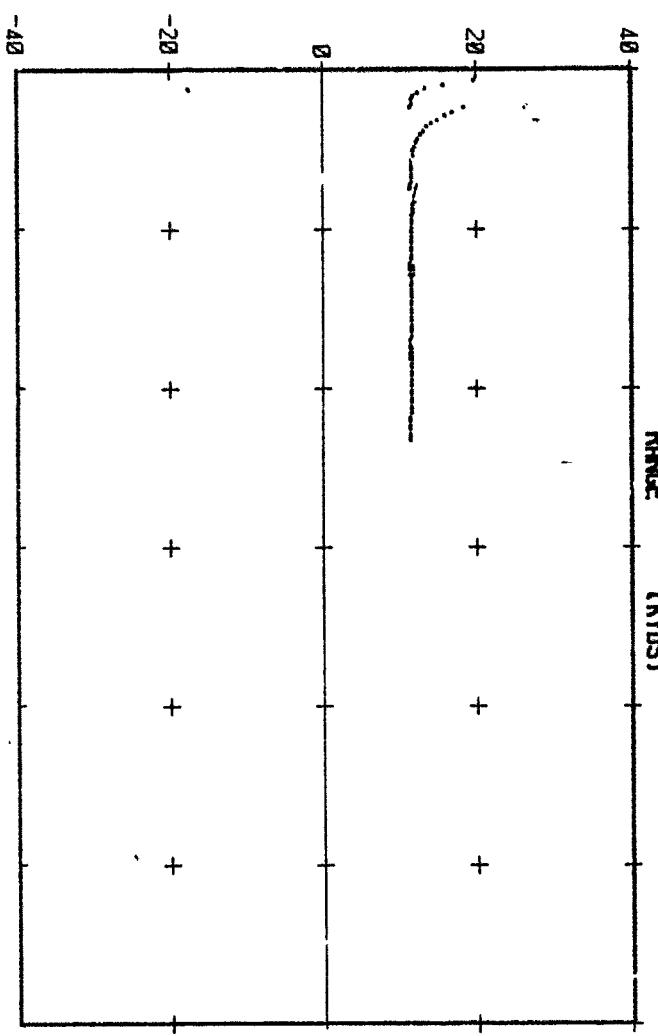
-117-



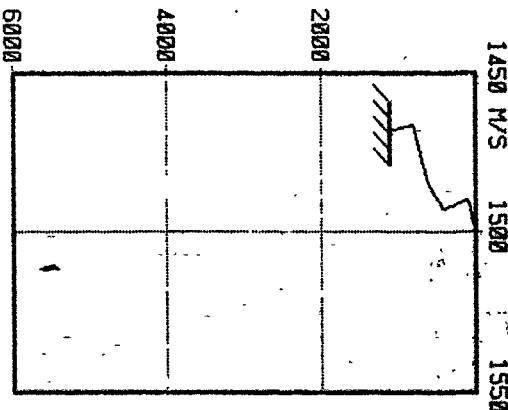
### DB LOSS



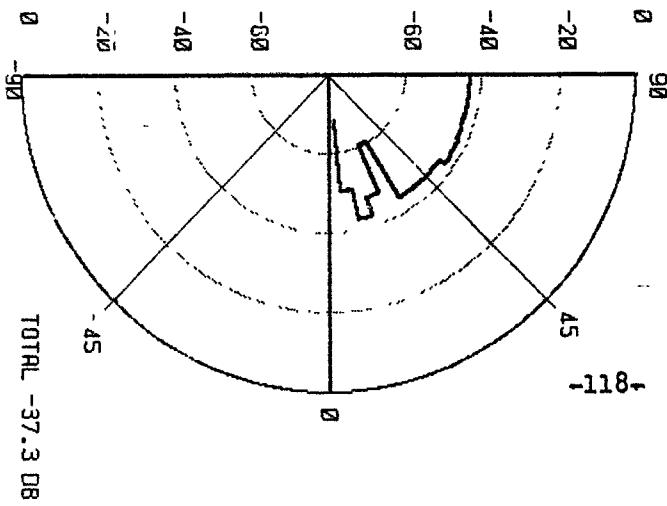
### ARRIVAL ANGLE



### DEPTH IN METERS



### NOISE (DB)



70

ARRER 4B SUMMER

S 50 R 3509 F 300

1450 M/S 1500 1550

LRAPP

DB LOSS

90

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

+

130

110

90

70

50

30

10

-10

-30

-50

-70

-90

-110

-130

-150

-170

-190

-210

-230

-250

-270

-290

-310

-330

-350

-370

-390

-410

-430

-450

-470

-490

-510

-530

-550

-570

-590

-610

-630

-650

-670

-690

-710

-730

-750

-770

-790

-810

-830

-850

-870

-890

-910

-930

-950

-970

-990

-1010

-1030

-1050

-1070

-1090

-1110

-1130

-1150

-1170

-1190

-1210

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-1790

-1810

-1830

-1850

-1870

-1890

-1910

-1930

-1950

-1970

-1990

-2010

-2030

-2050

-2070

-2090

-2110

-2130

-2150

-2170

-2190

-2170

-2150

-2130

-2110

-2090

-2070

-2050

-2030

-2010

-1990

-1970

-1950

-1930

-1910

-1890

-1870

-1850

-1830

-1810

-1790

-1770

-1750

-1730

-1710

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-1190

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-1110

-1090

-1070

-1050

-1030

-1010

-990

-970

-950

-930

-910

-890

-870

-850

-830

-810

-790

-770

-750

-730

-710

-690

-670

-650

-630

-610

-590

-570

-550

-530

-510

-490

-470

-450

-430

-410

-390

-370

-350

-330

-310

-290

-270

-250

-230

-210

-190

-170

-150

-130

-110

-90

-70

-50

-30

-10

+10

+30

+50

+70

+90

+110

+130

+150

+170

+190

+210

+230

+250

+270

+290

+310

+330

+350

+370

+390

+410

+430

+450

+470

+490

+510

+530

+550

+570

+590

+610

+630

+650

+670

+690

+710

+730

+750

+770

+790

+810

+830

+850

+870

+890

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+1030

+1050

+1070

+1090

+1110

+1130

+1150

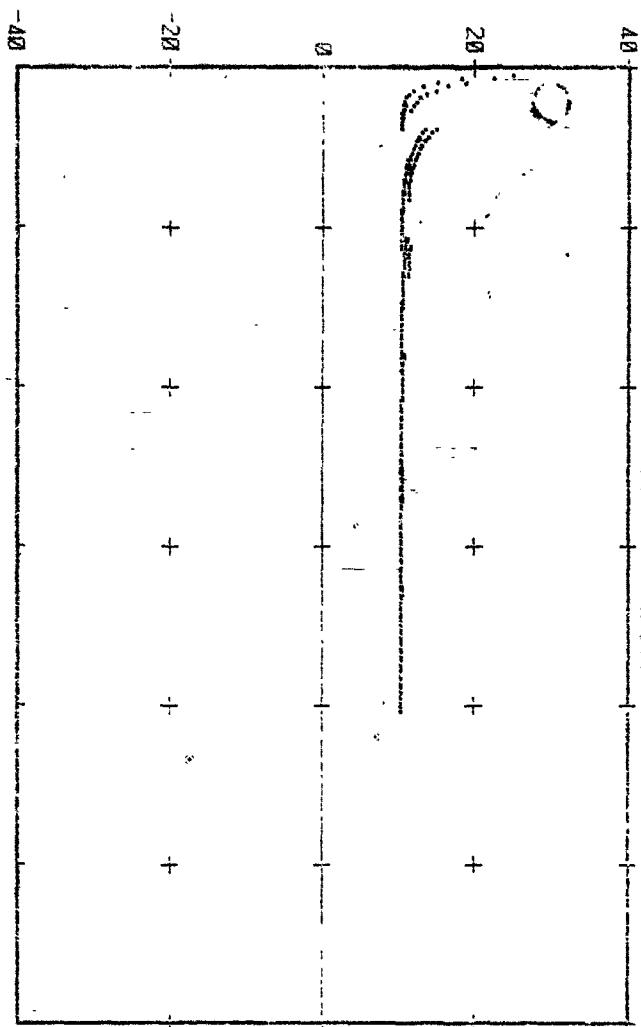
+1170

+1190

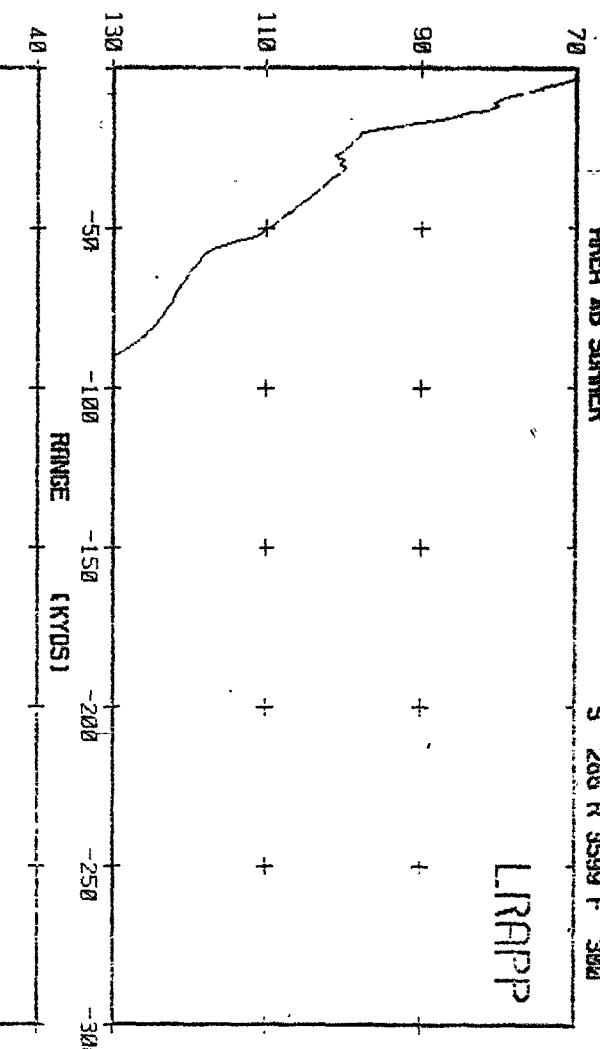
+1210

+1230

ARRIVAL ANGLE

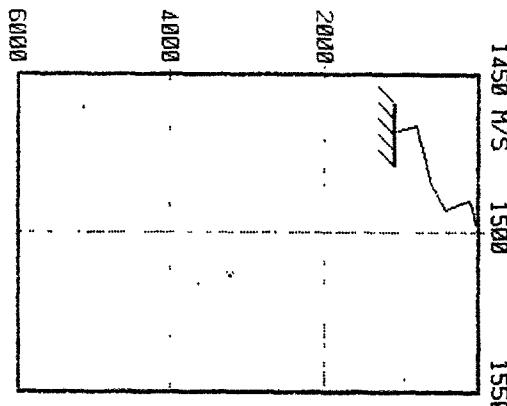


DB LOSS

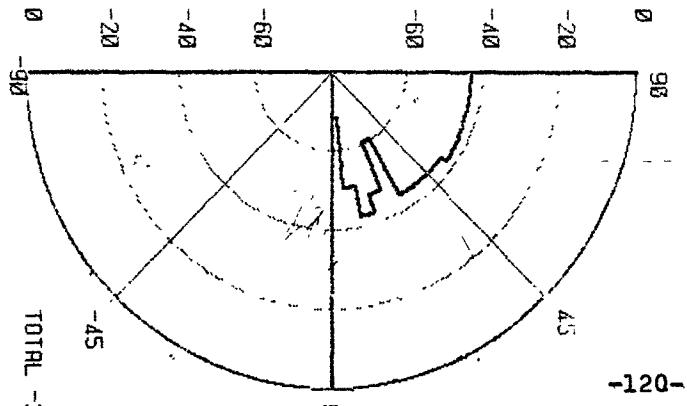


LRAFP

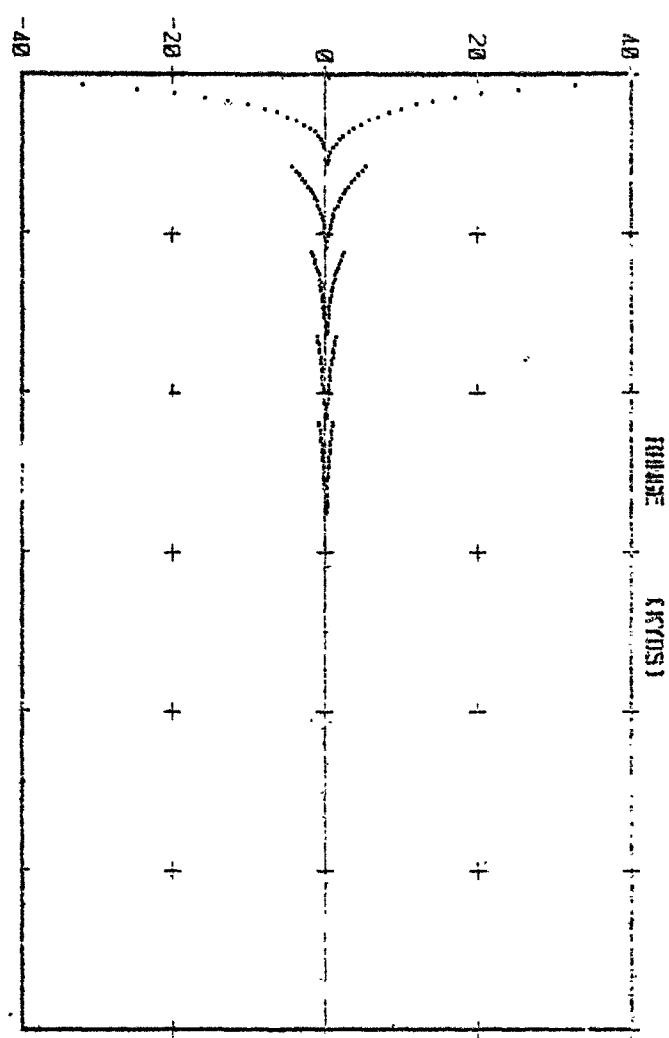
DEPTH IN METERS



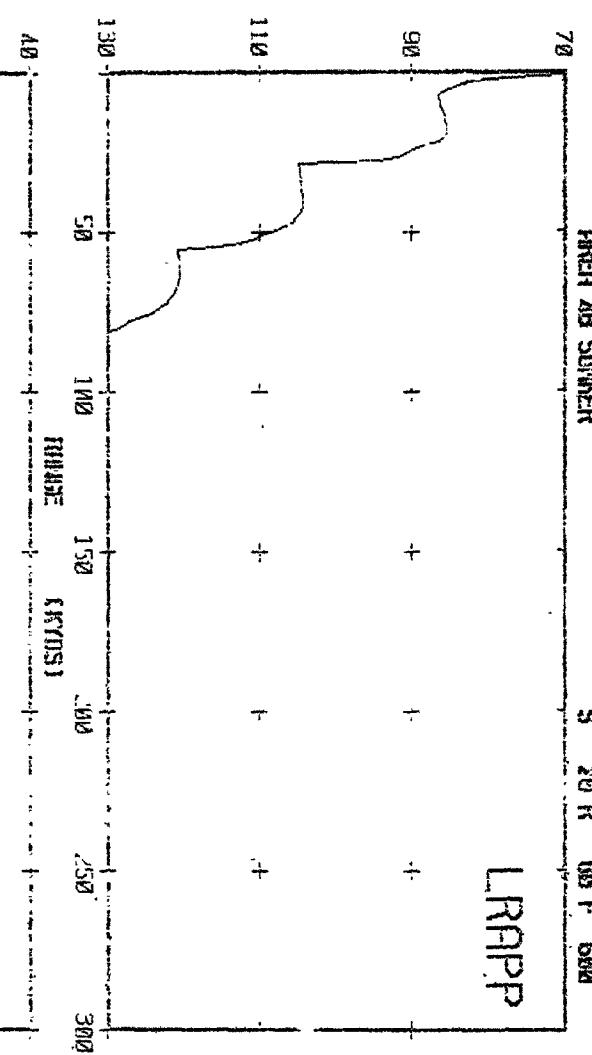
NOISE (dB)



### ARRIVAL ANGLE

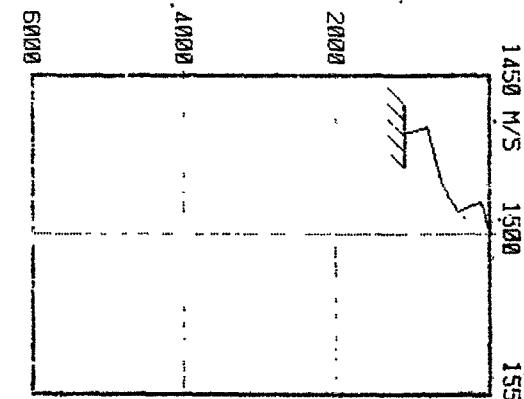


### DB LOSS

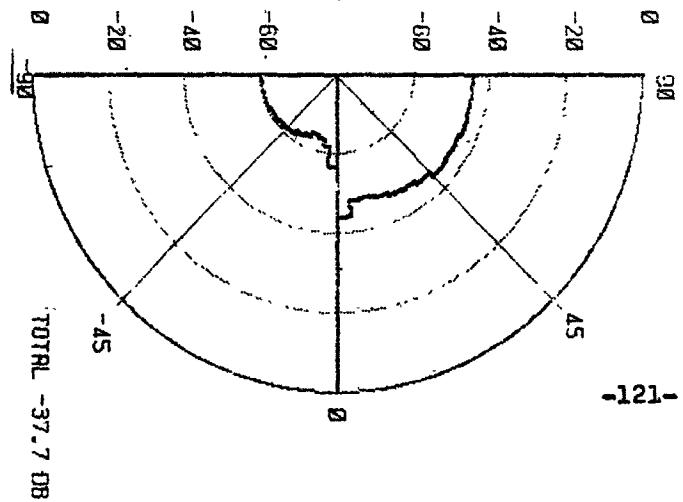


LRAFP

### DEPTH IN METERS



### NOISE (DB)



TOTAL -37.7 DB

-121-

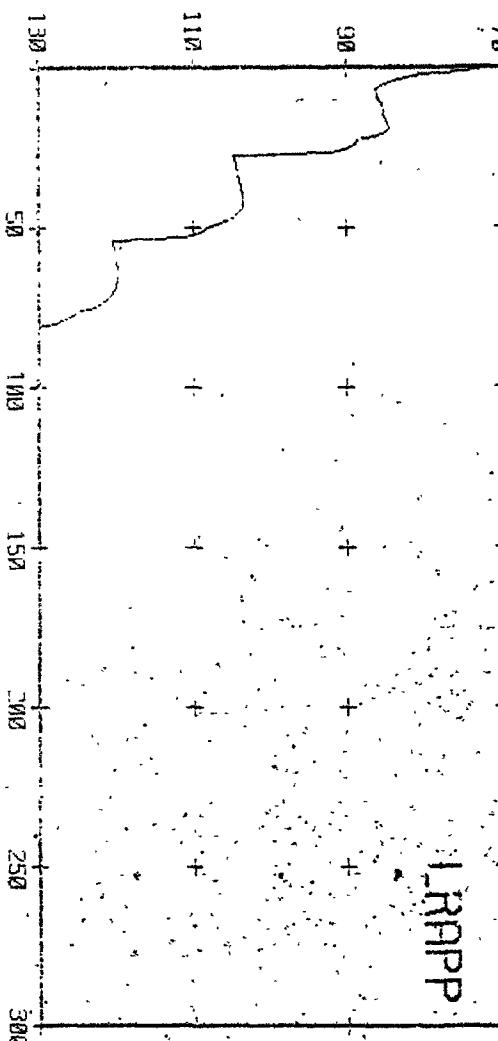
AFTER AB SUMMER

S 50 R 60 F 600

1450 M/S 1500 1550

I RAPP

DB LOSS



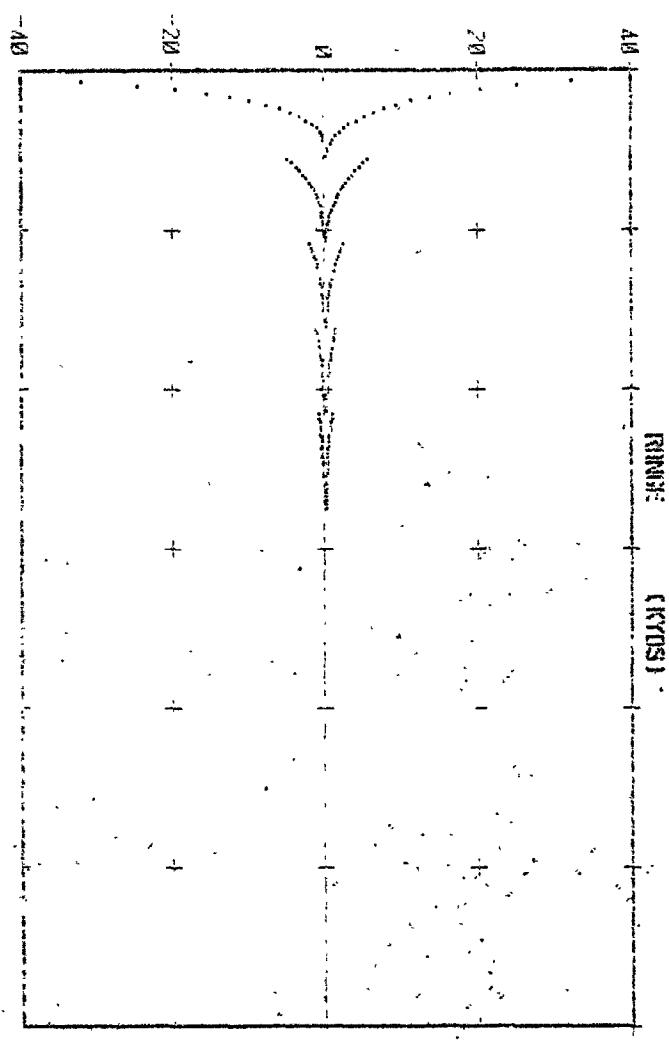
DEPTH IN METERS

2000

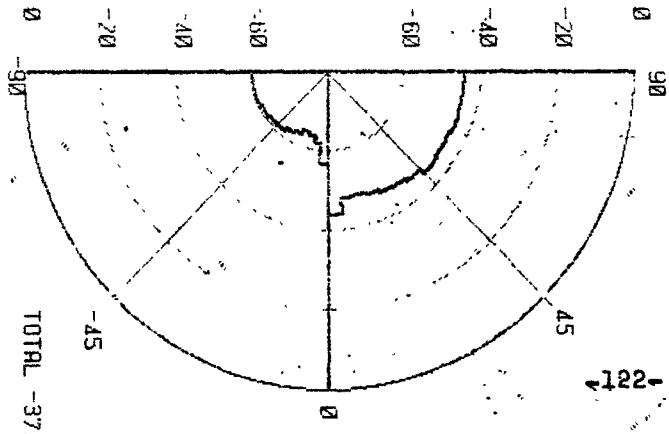
4000

6000

ARRIVAL ANGLE



NOISE (DB)



TOTAL -37.7 DB

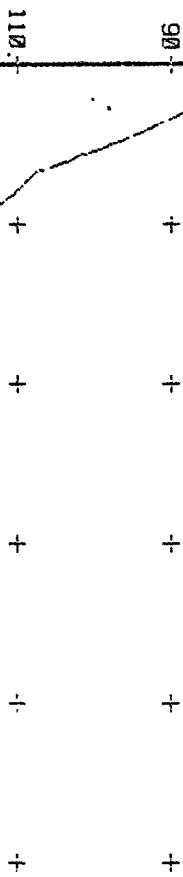
FREER AB SUMMER

S. 265 R. 89 F. 683

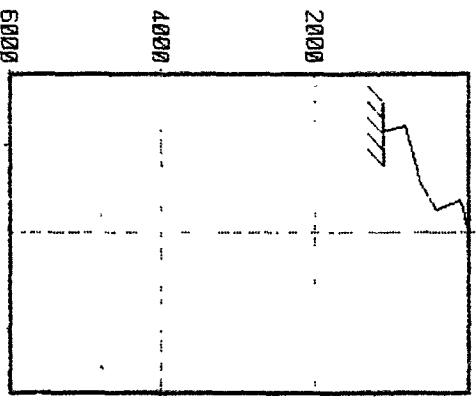
1450 M/S 1500 1550

LRAAPP

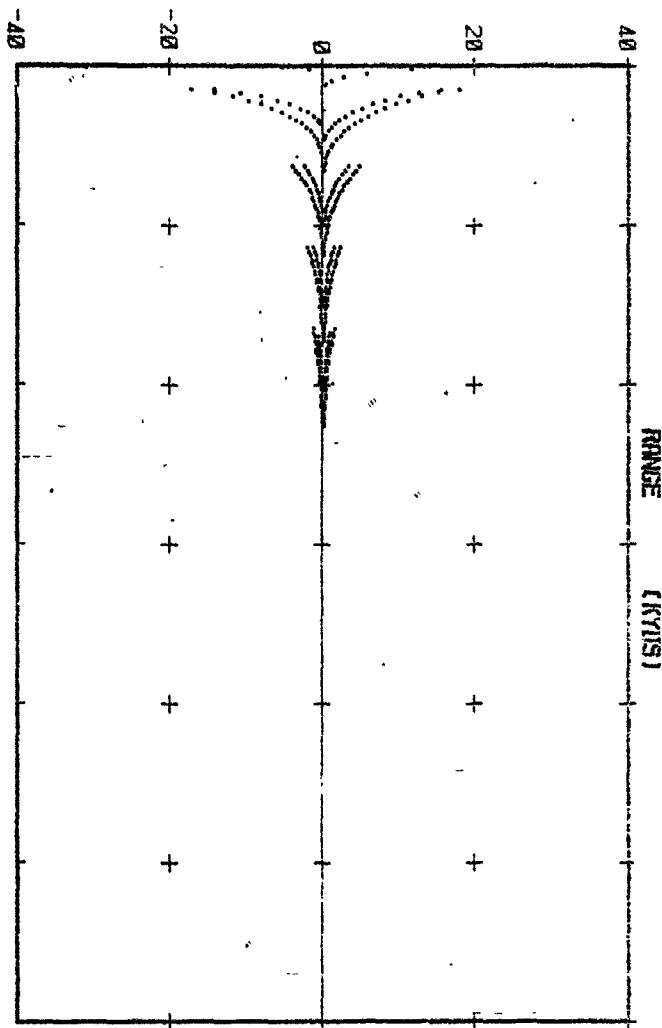
DB LOSS



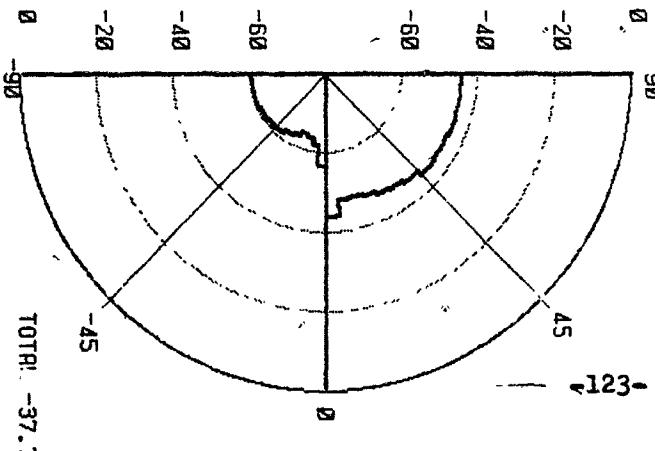
DEPTH IN METERS



ARRIVAL ANGLE

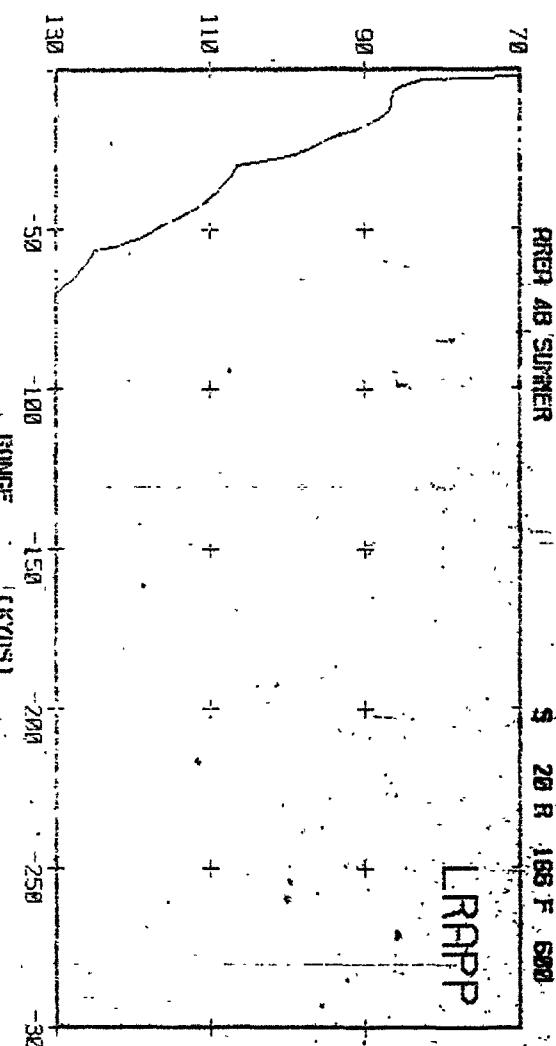


NOISE (DB)

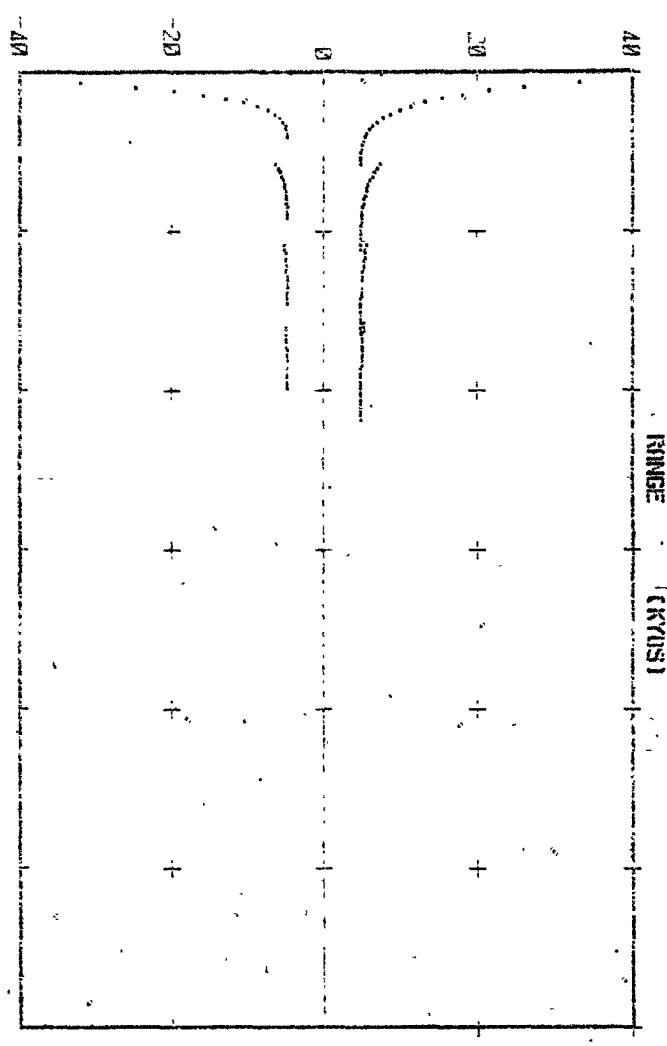


TOTAL -37.7 DB

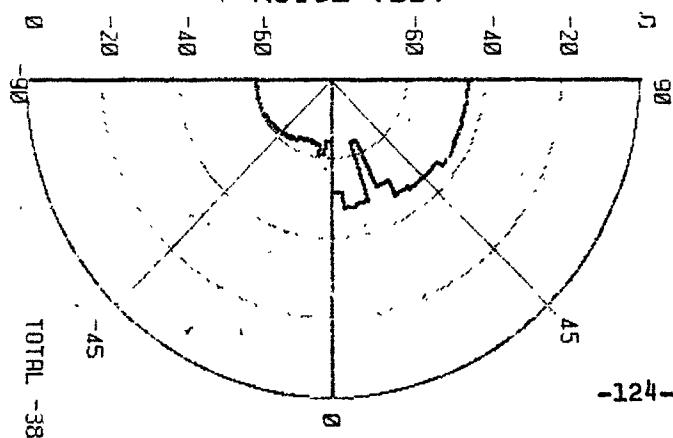
DB LOSS



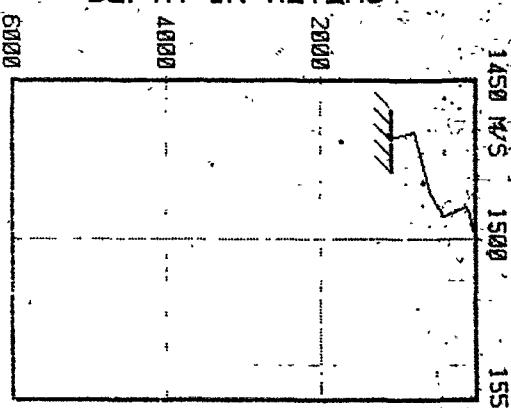
ARRIVAL ANGLE



NOISE (DB)



DEPTH IN METERS



AREA AB SUMMER

S 50' R 105' F 500'

1450 M/S 1500 1550

LRAFP

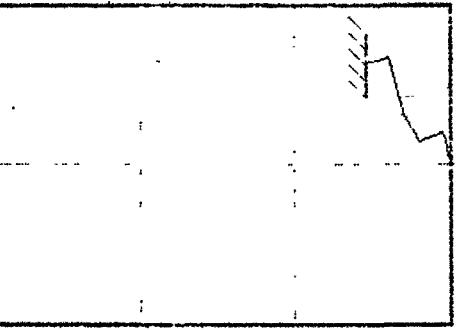
LS LOSS

90 110 130



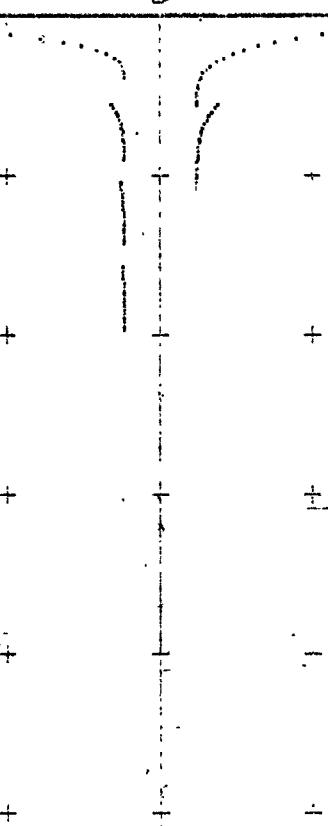
DEPTH IN METERS

2000 4000 6000

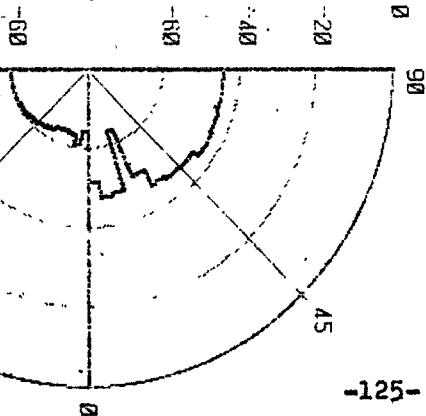


ARRIVAL ANGLE

20 0 -20



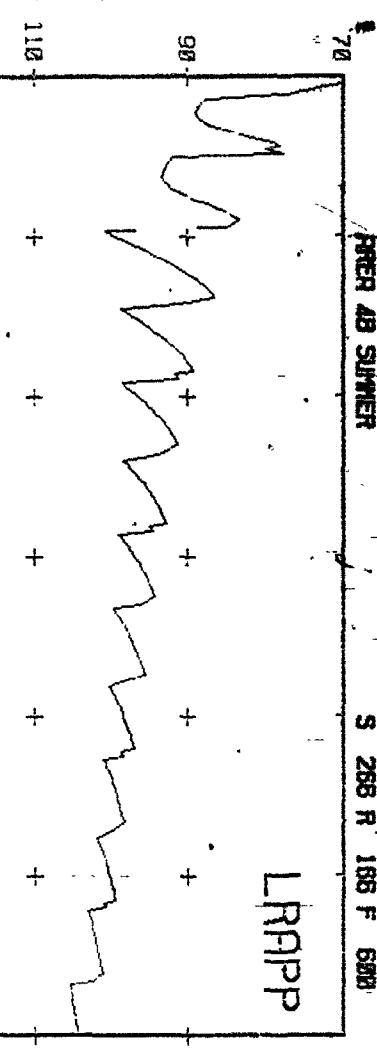
NOISE (DB)



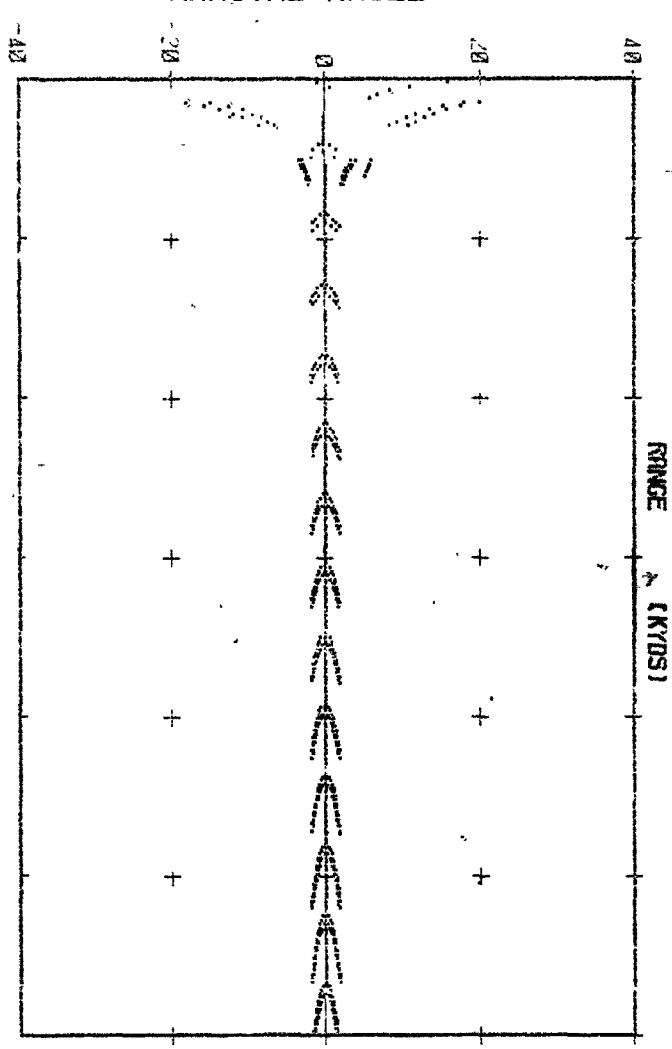
-40

0 TOTAL -38.8 DB

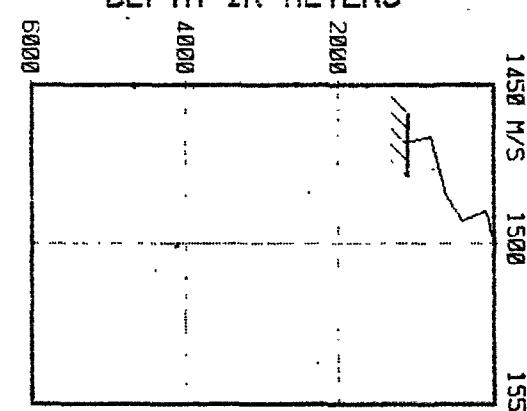
DB LOSS



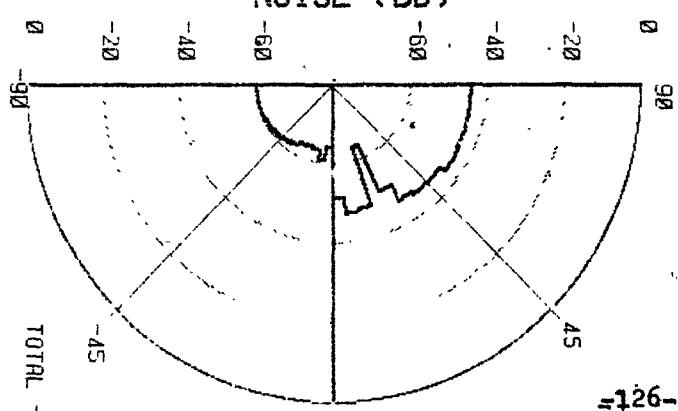
ARRIVAL ANGLE



DEPTH IN METERS



NOISE (DB)



TOTAL -35.8 dB

FRRR AB SUMMER

S 20 R 300 F 650

1450 M/S 1500 1550

I RAPP

DB LOSS

90

110

130

-50

-100

-150

-200

-250

-300

100

400

800

1200

1600

2000

2400

2800

3200

DB LOSS

100

200

300

400

500

600

700

800

900

1000

1100

1200

1300

1400

1500

1600

1700

1800

1900

2000

2100

2200

2300

2400

2500

2600

2700

2800

2900

3000

3100

3200

3300

3400

3500

3600

3700

3800

3900

4000

4100

4200

4300

4400

4500

4600

4700

4800

4900

5000

5100

5200

5300

5400

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5600

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6800

6900

7000

7100

7200

7300

7400

7500

7600

7700

7800

7900

8000

8100

8200

8300

8400

8500

8600

8700

8800

8900

9000

9100

9200

9300

9400

9500

9600

9700

9800

9900

10000

10100

10200

10300

10400

10500

10600

10700

10800

10900

11000

11100

11200

11300

11400

11500

11600

11700

11800

11900

12000

12100

12200

12300

12400

12500

12600

12700

12800

12900

13000

13100

13200

13300

13400

13500

13600

13700

13800

13900

14000

14100

14200

14300

14400

14500

14600

14700

14800

14900

15000

15100

15200

15300

15400

15500

DEPTH IN METERS

2000

4000

6000

8000

10000

12000

14000

16000

18000

20000

22000

24000

26000

28000

30000

32000

34000

36000

38000

40000

42000

44000

46000

48000

50000

52000

54000

56000

58000

60000

62000

64000

66000

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92000

94000

96000

98000

100000

102000

104000

106000

108000

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112000

114000

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124000

126000

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184000

186000

188000

190000

192000

194000

196000

198000

200000

202000

204000

206000

208000

210000

212000

</div

DB LOSS

ARRIVED SUMMER

SEASIDE R. 300 F. 300

WATER TEMPERATURE 14.5°C M/S 1800  
TIDE 7550

L Rapp

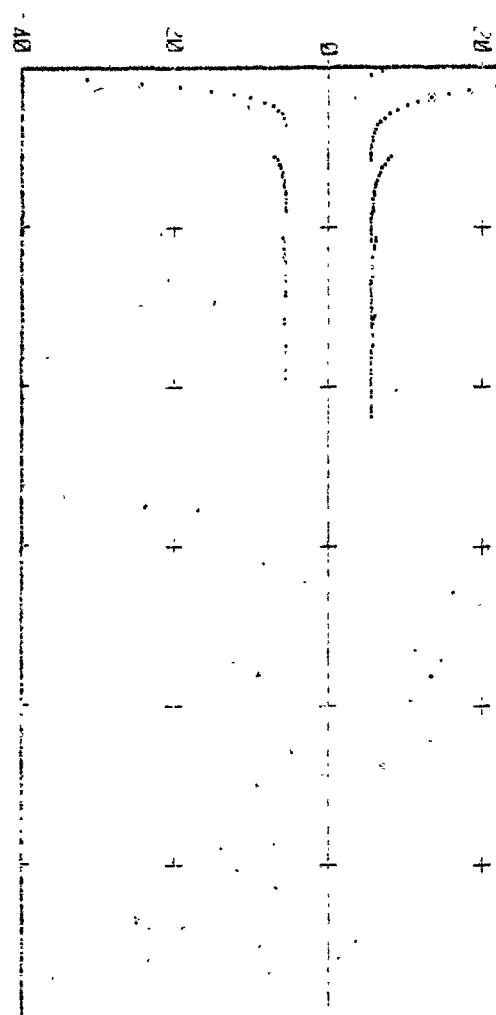
DEPTH IN METERS

130 110 90  
-50 -100 -150 -200 -250 -300

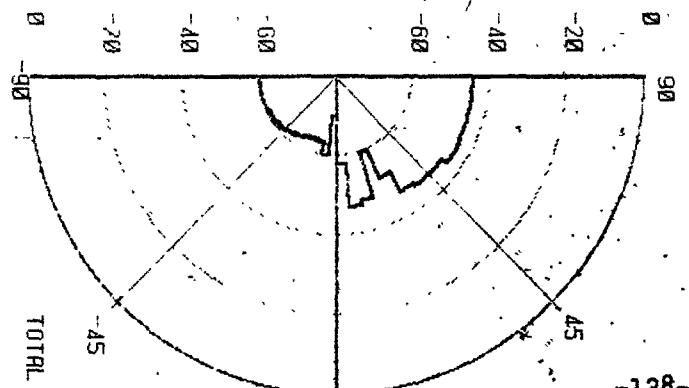
RANGE (KMS)

2000  
4000

ARRIVAL ANGLE



NOISE (DB)



TOTAL -38.9 DB

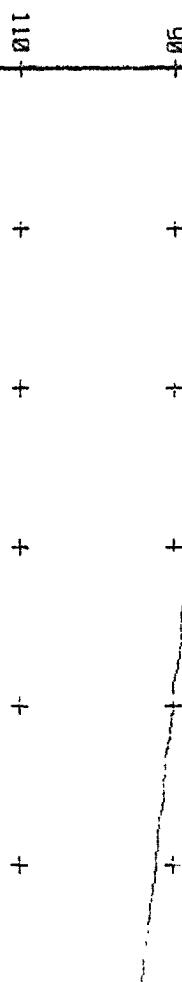
AER 4B SUMMER

S 268 R 300 F 600

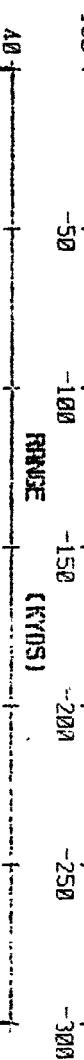
1450 N/S 1500 1550

LRAPP

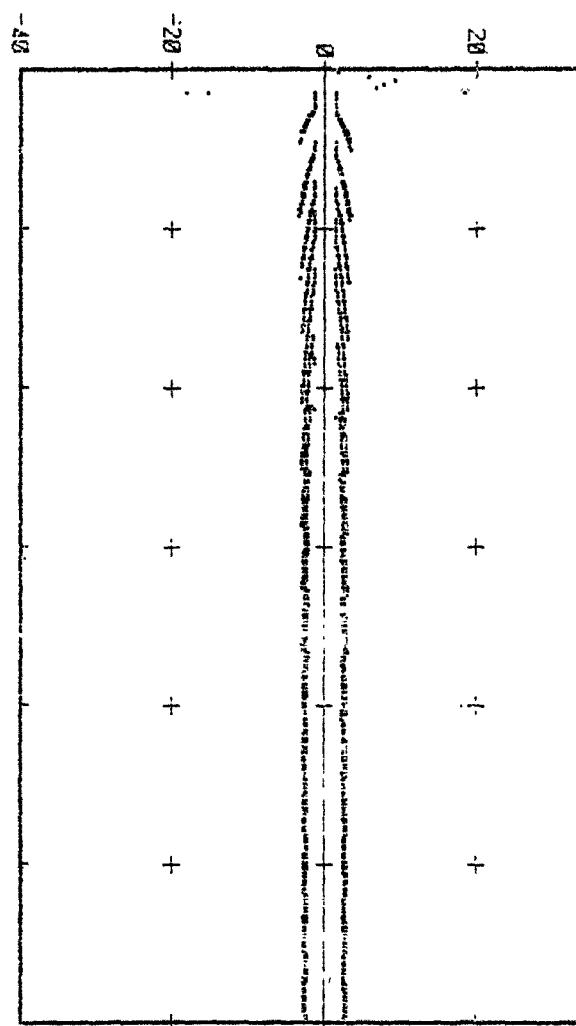
DB LOSS



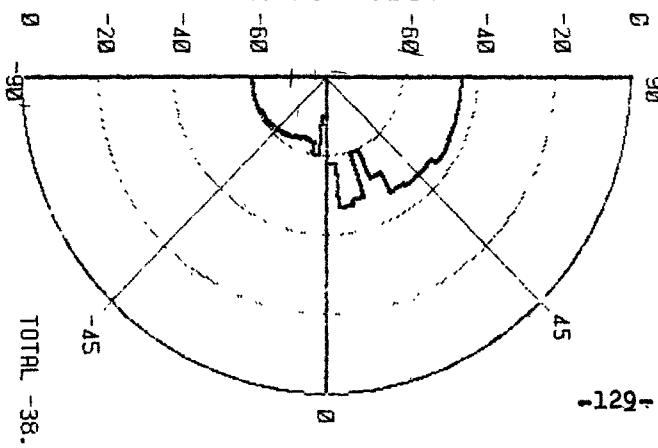
DEPTH IN METERS



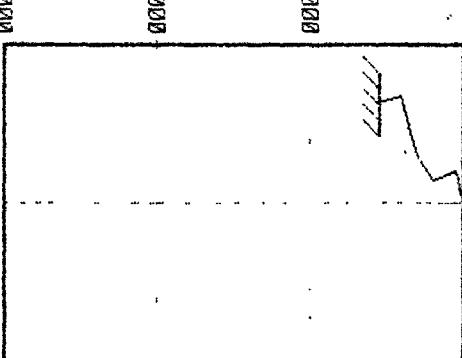
ARRIVAL ANGLE



NOISE (DB)



TOTAL -38.9 DB



-129-

GER 48 SUMMER

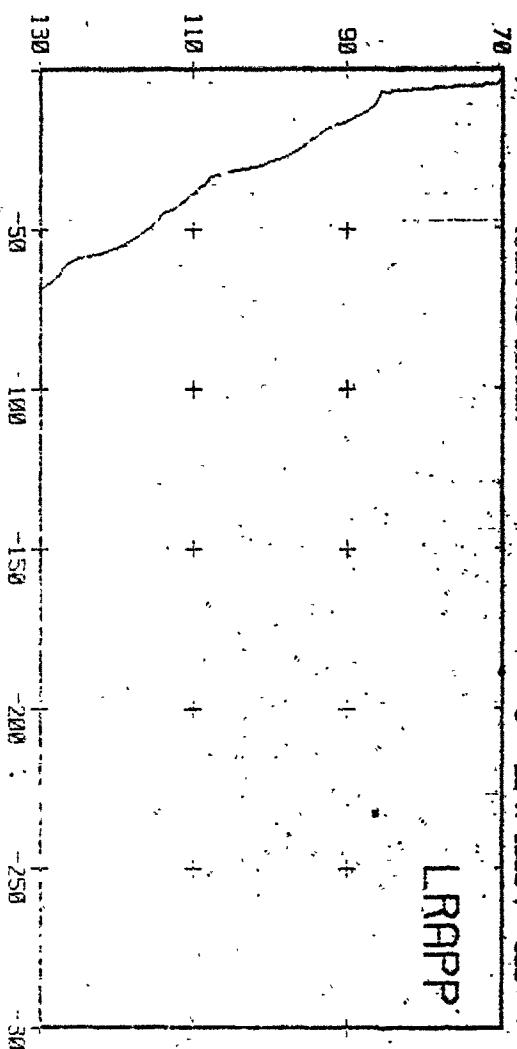
S 20 N 1000 F 600

1450

M/S 1500

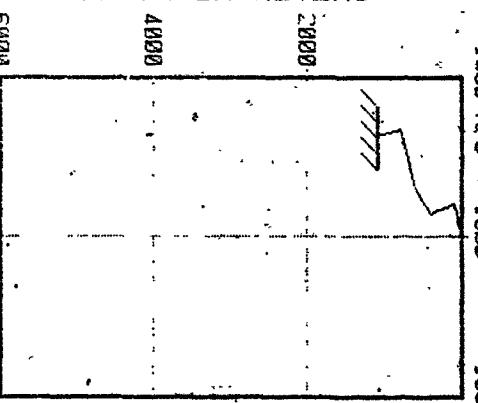
1550

### DB LOSS

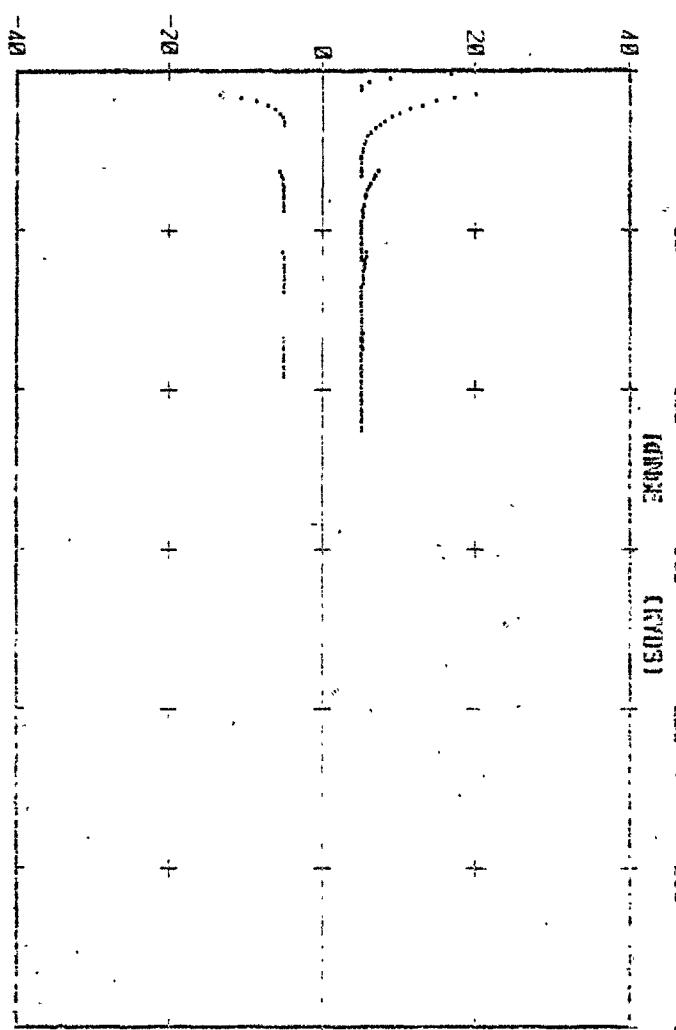


LRAFP

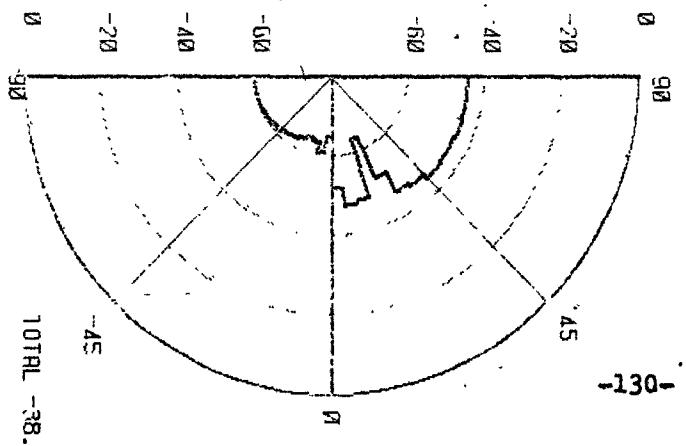
### DEPTH IN METERS



### ARRIVAL ANGLE



### NOISE (DB)



70

FREQUENCY

S 53 R 145M F GND

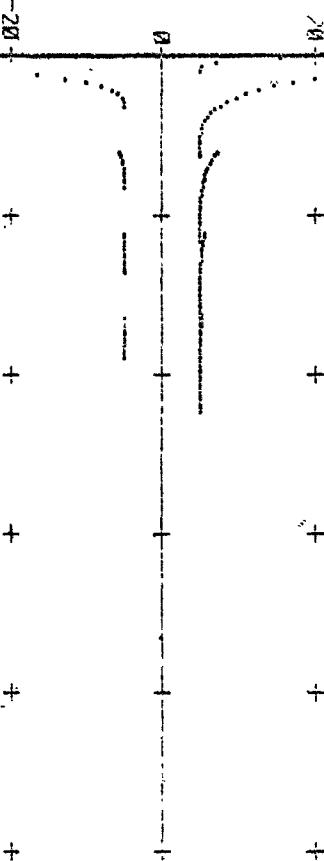
1450 M/S 1500 1550

LRAPP

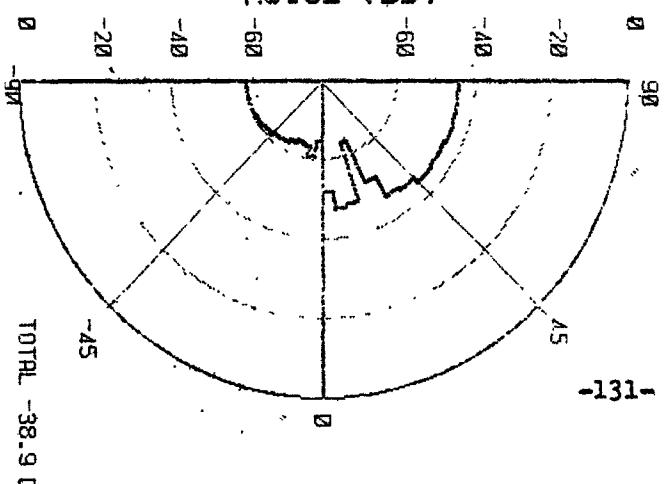
DEPTH IN METERS

130  
110  
40  
RUNE (KHZ)0  
2000  
4000  
6000

ARRIVAL ANGLE



NOISE (DB)



TOTAL -38.9 DB

AII

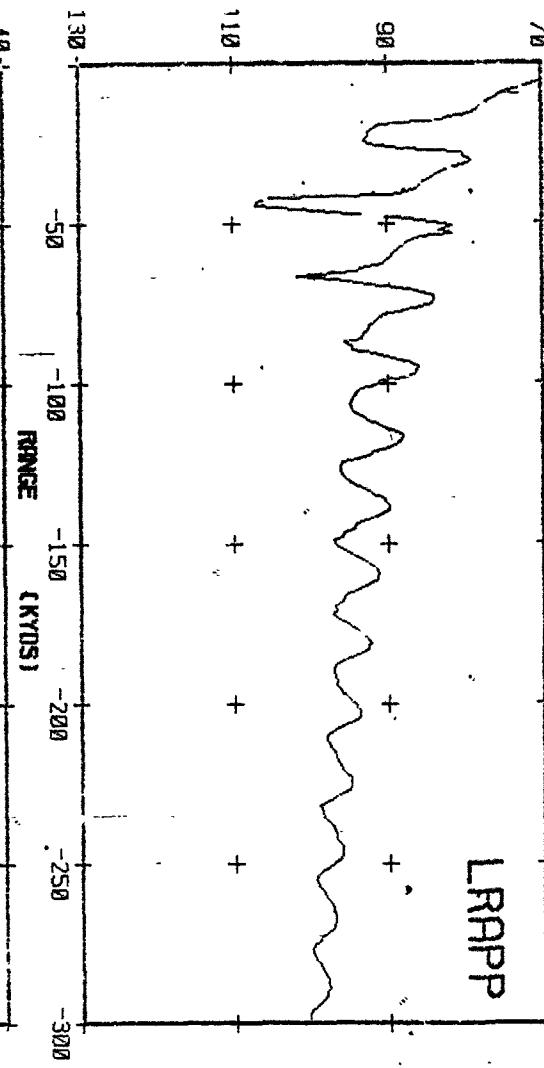
PAGE 4B SUMMER

S 268 R 1000 F 600

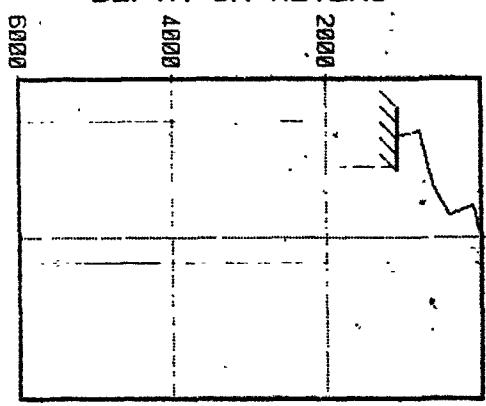
1450 M/S 1500 1550

### LRRAPP

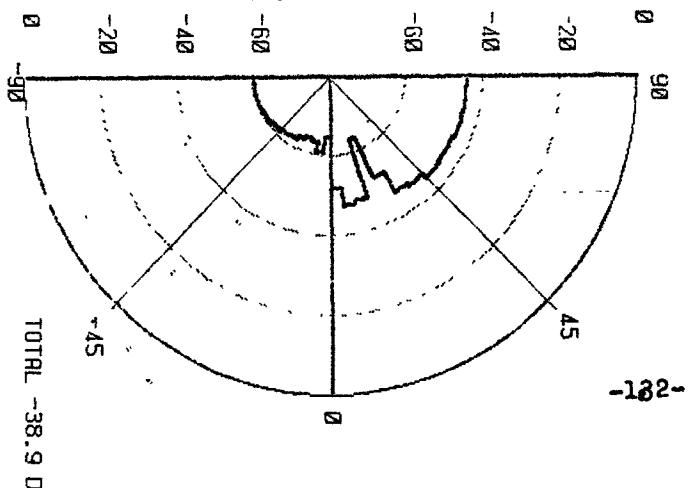
### DB LOSS



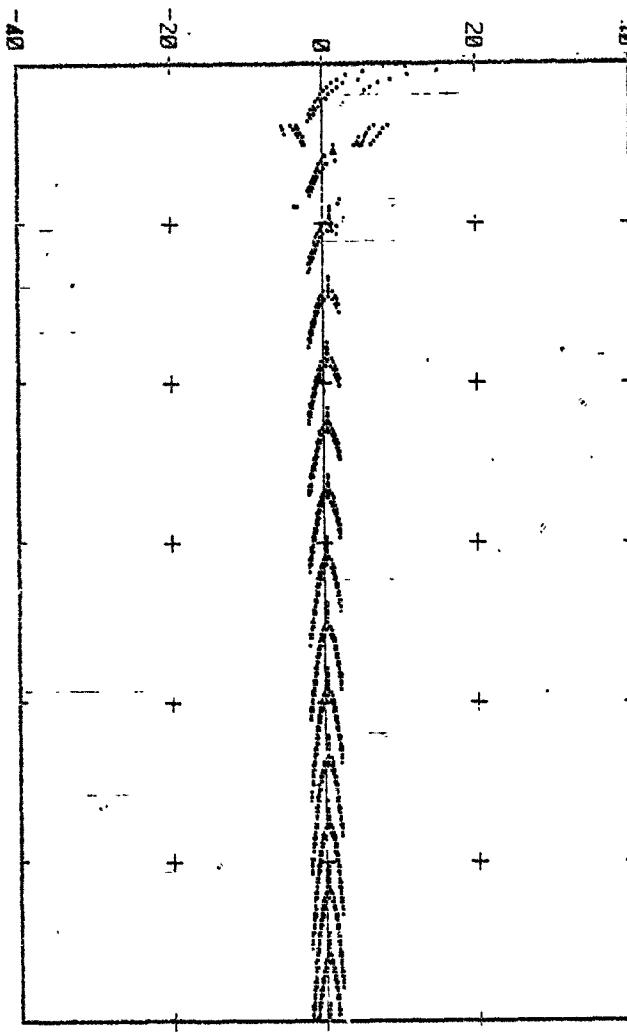
### DEPTH IN METERS

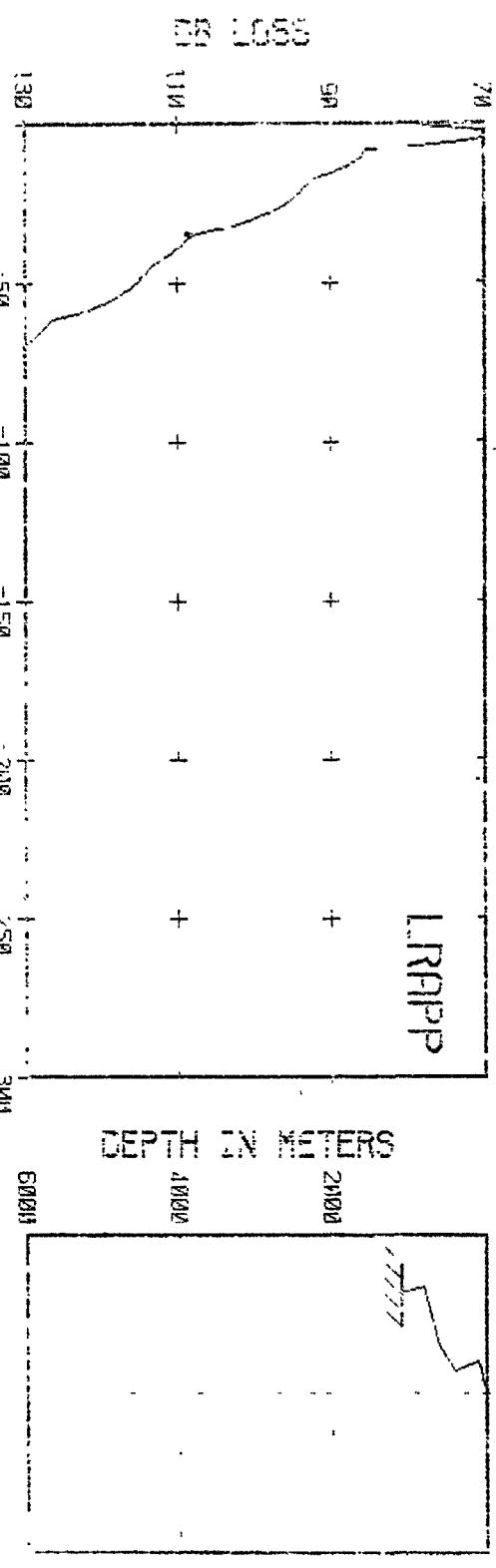
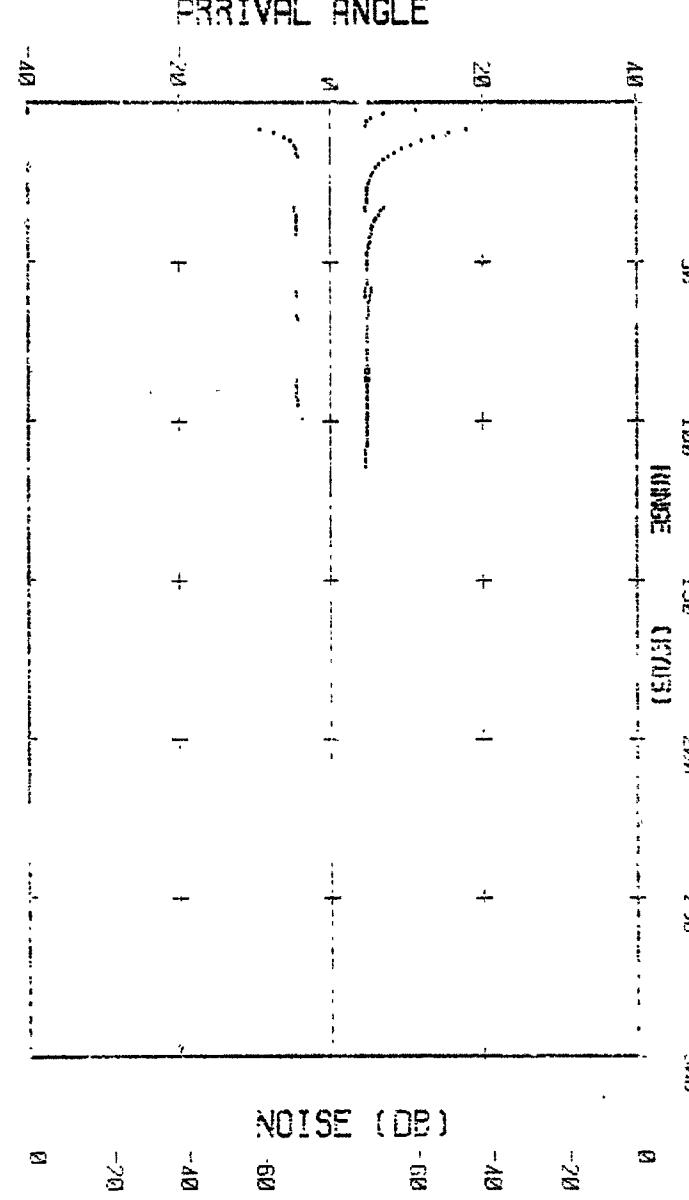
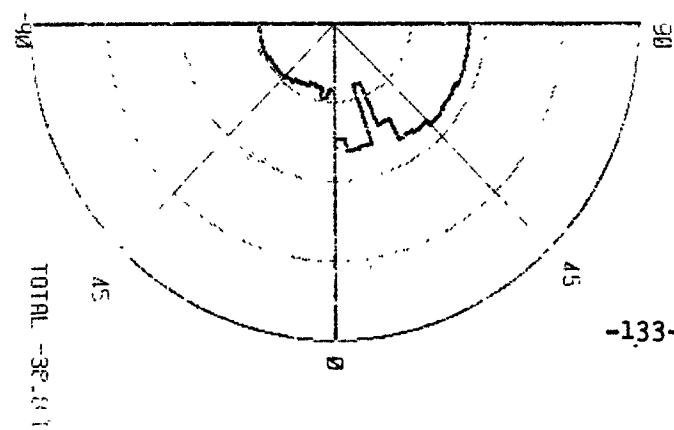


### NOISE (DB)



### ARRIVAL ANGLE





FIRE AB SUMMER

5 28 R 1312 F 693

1450 M/S 1500 15'N

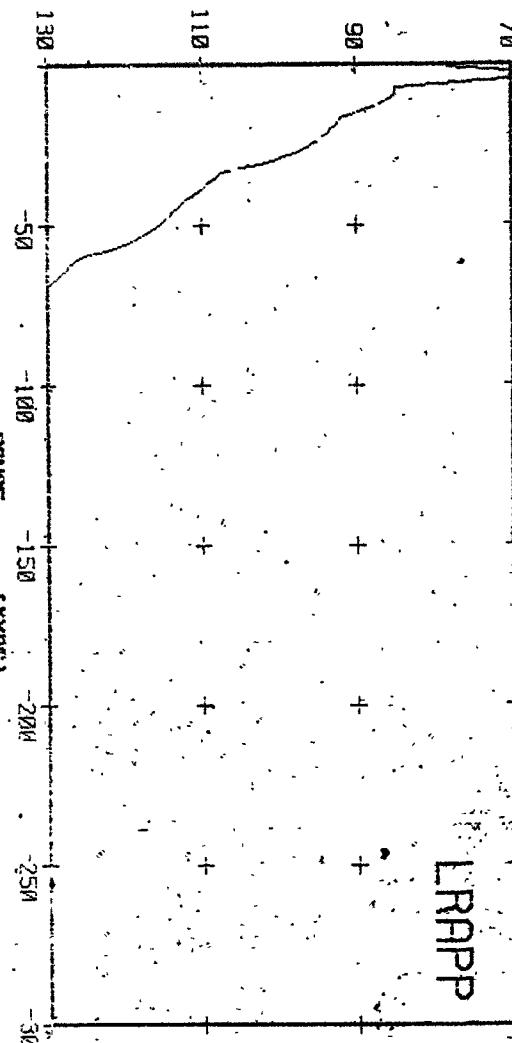
70

AREA AB SUMMER

S 50' R 1312' E 680'

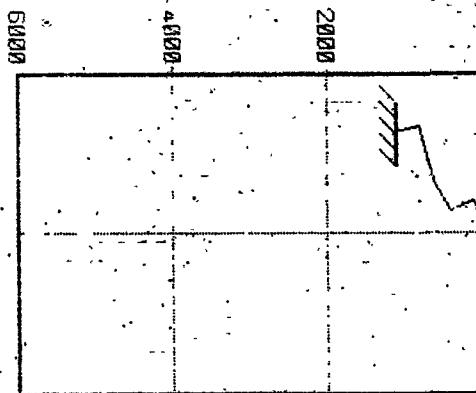
1450 M/S 1500 1550

## DB LOSS

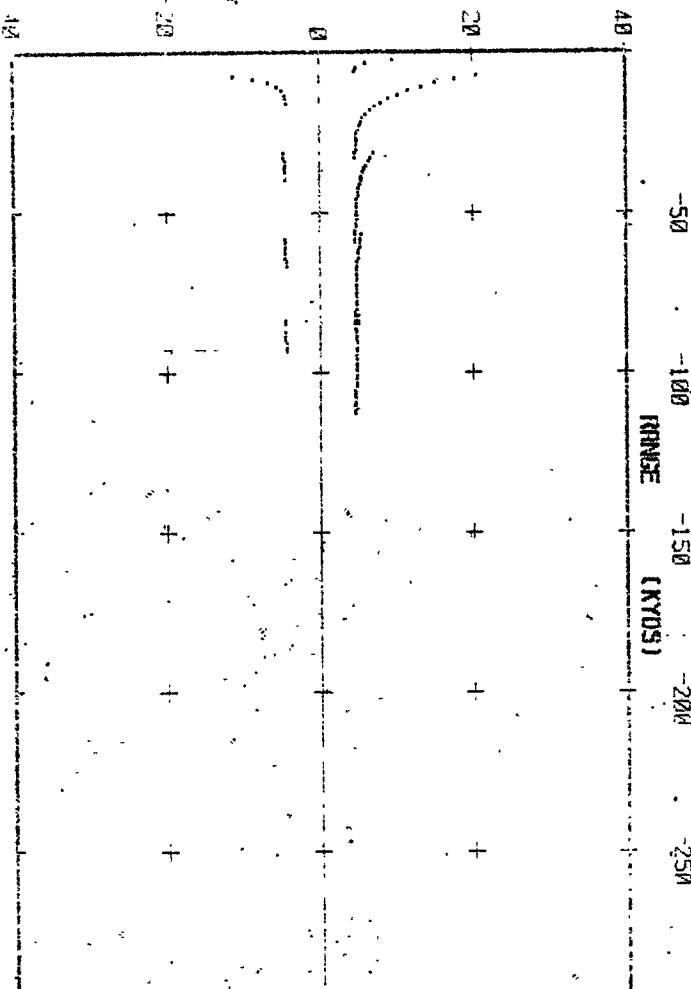


LRAPP

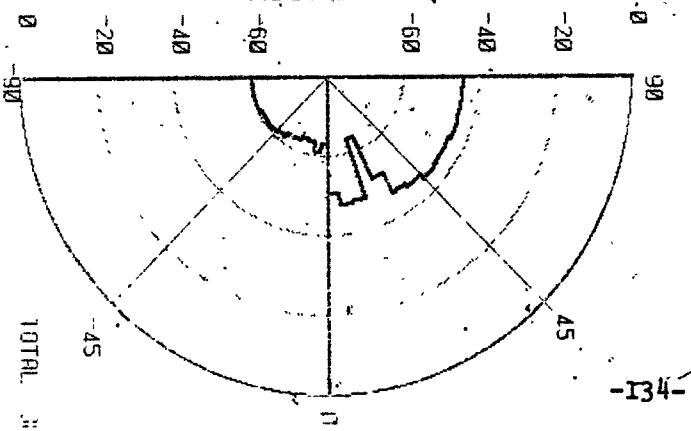
## DEPTH IN METERS



## ARRIVAL ANGLE



## NOISE (DB)



-134-

TOTAL

70

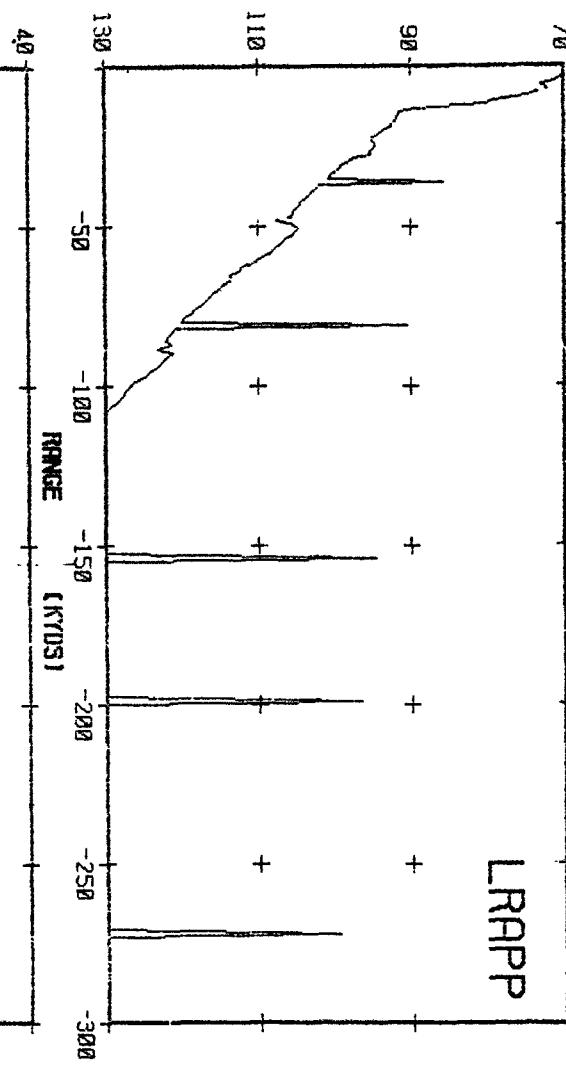
AREA 4B SUMMER

S 268 R 1312 F 600

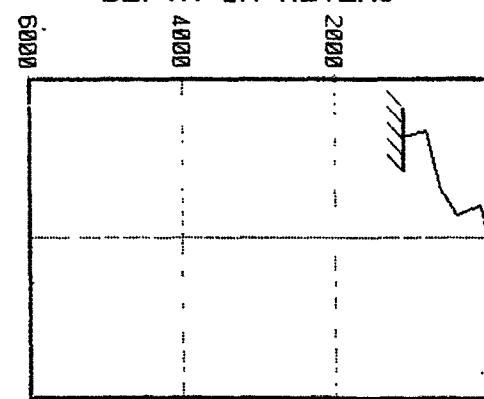
1450 M/S 1500 1550

LRAPP

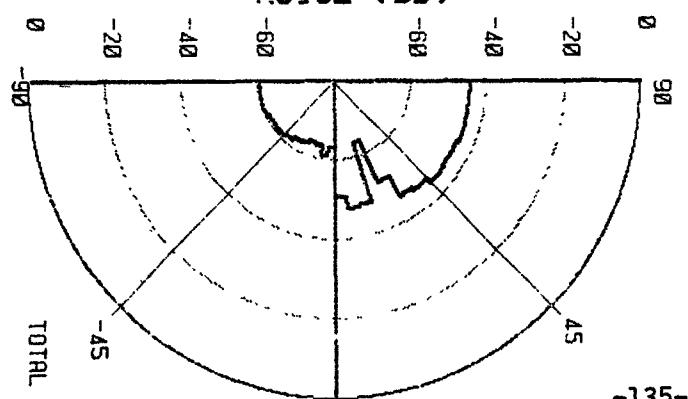
DB LOSS



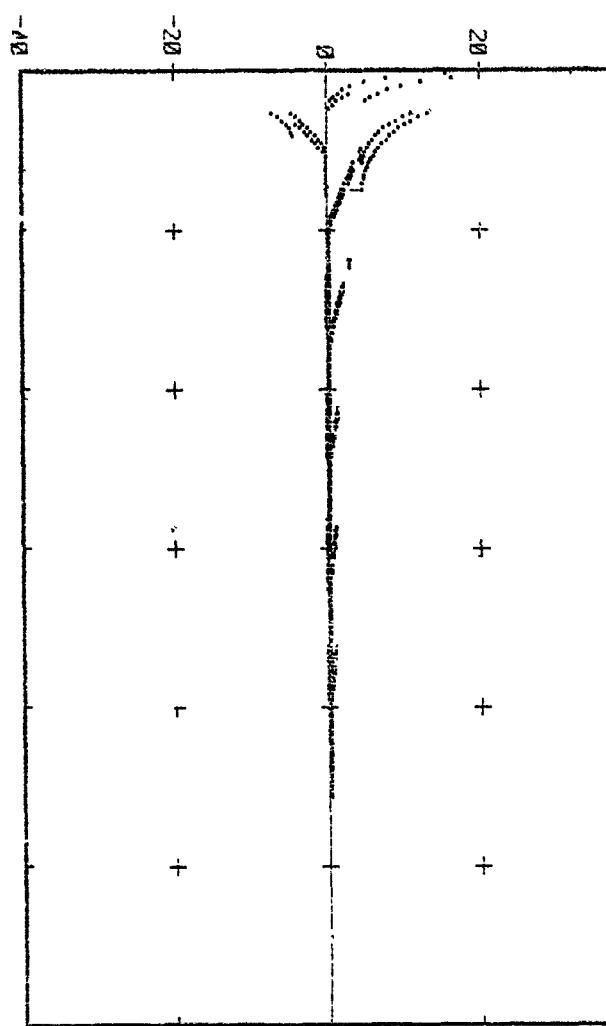
DEPTH IN METERS



NOISE (DB)



ARRIVAL ANGLE



-1a

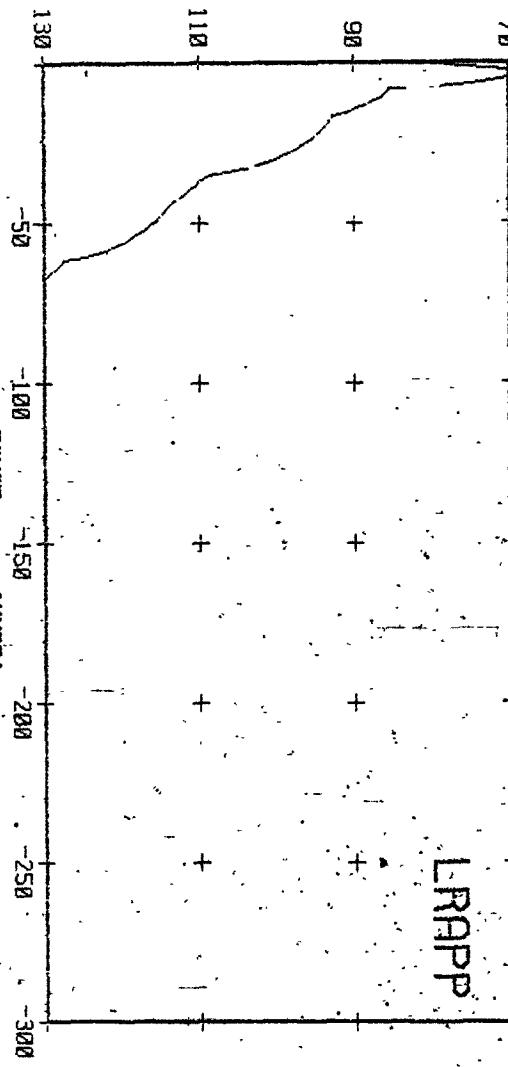
70

AREA AB SUMMER

S 20 R 15WB F 6300

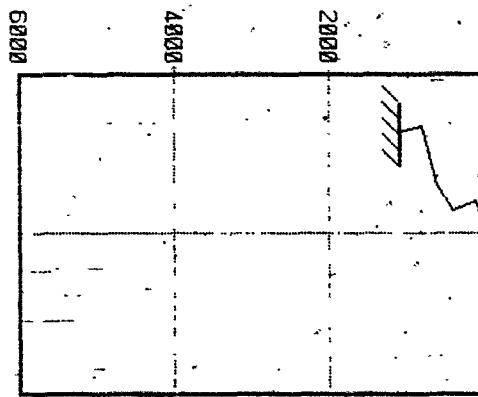
1450 M/S 1500 1550

## DB LOSS

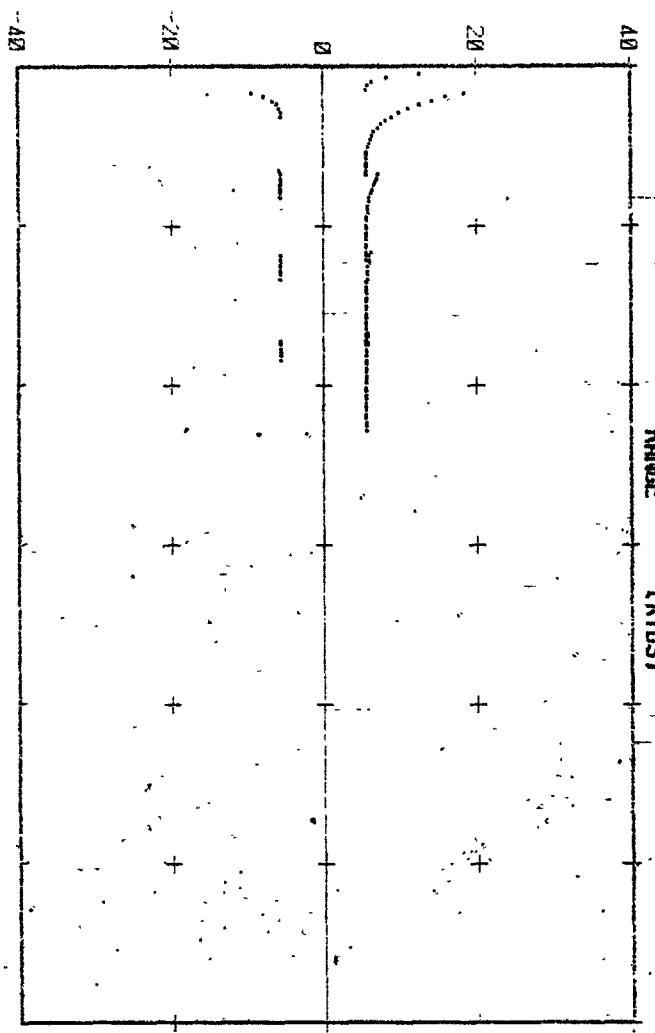


LRAPP

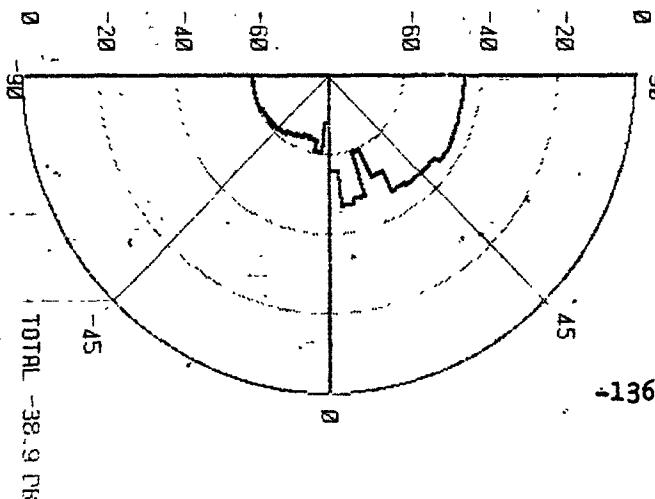
## DEPTH IN METERS



## ARRIVAL ANGLE



## NOISE (DB)



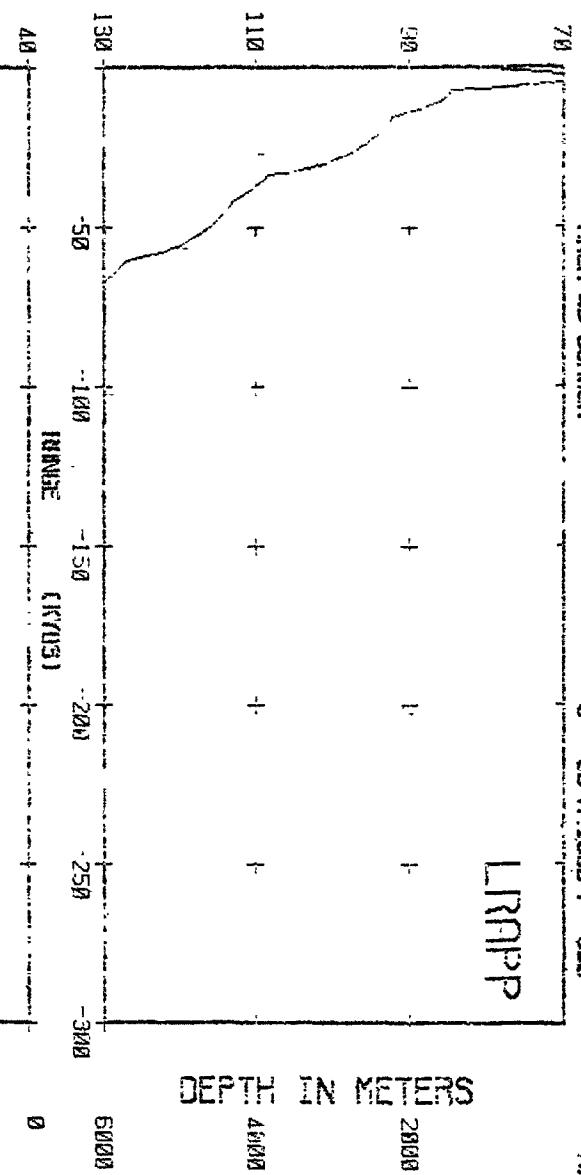
-136-

AREA 4B SUMMER

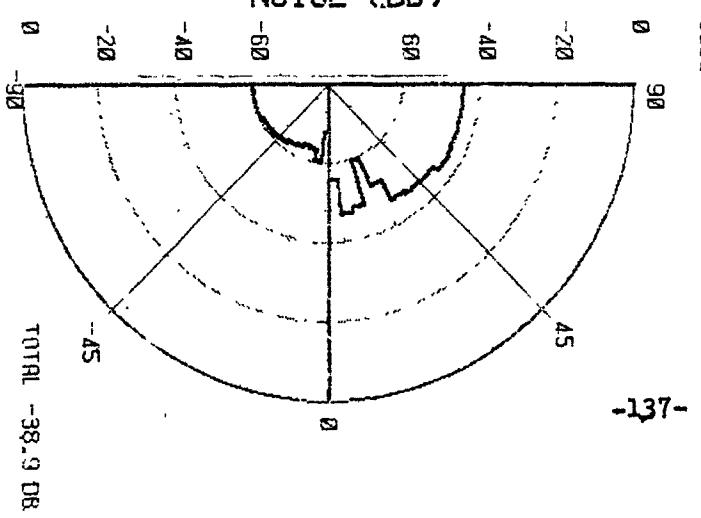
S 50 R 1500 F 600

1450 M/S 1500 1550

### DB LOSS



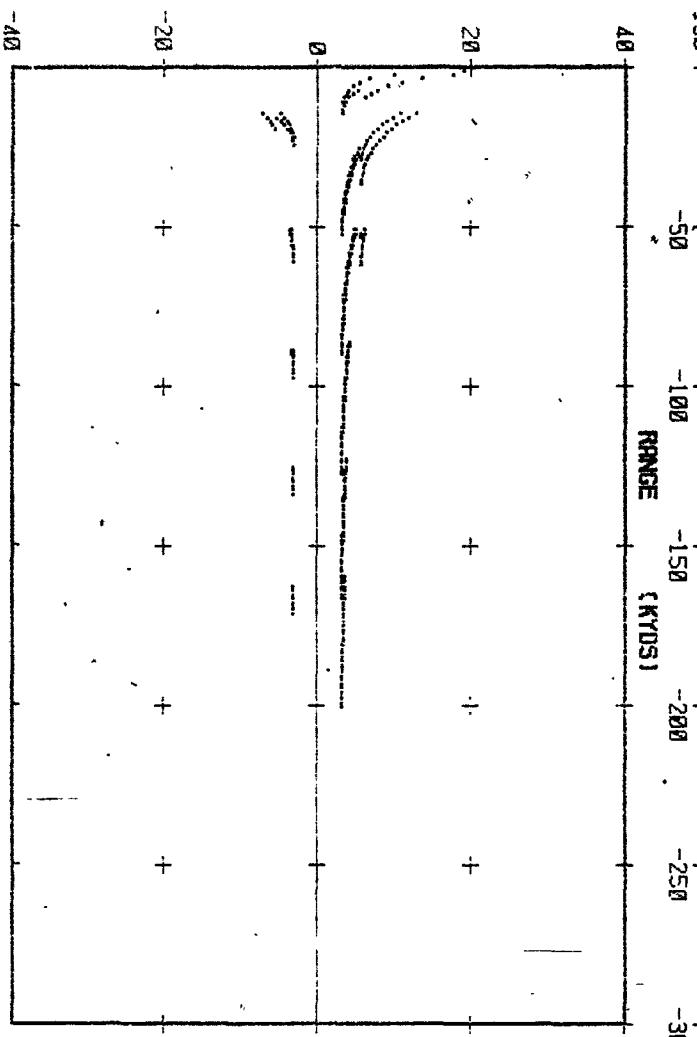
### NOISE (DB)



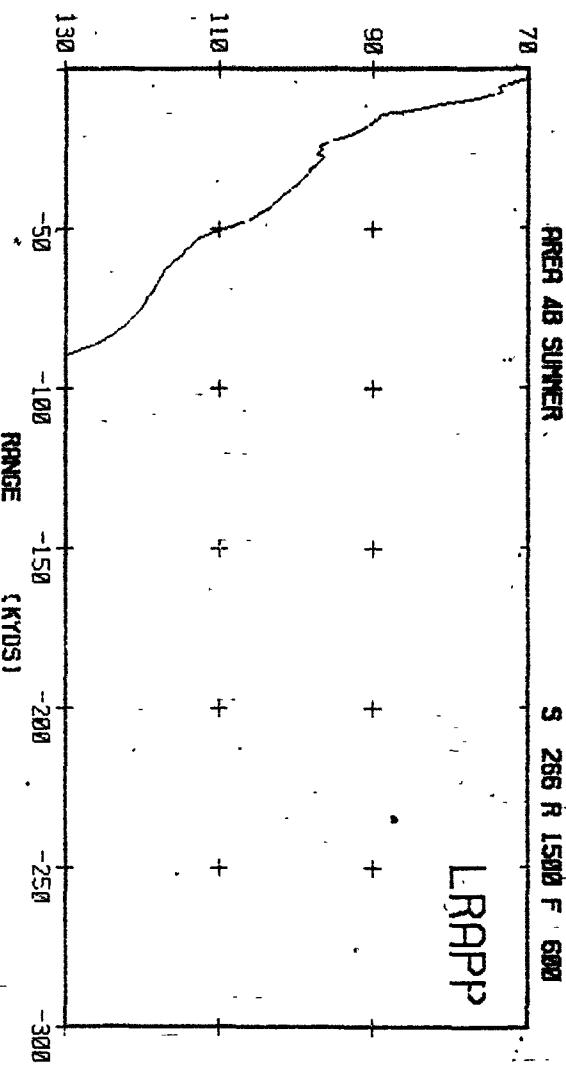
-137-

TOTAL -38.9 DB

ARRIVAL ANGLE

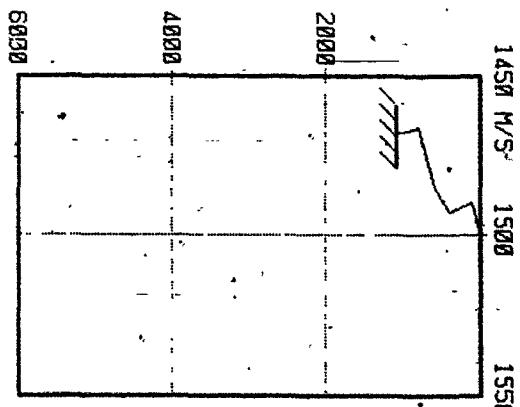


DB LOSS

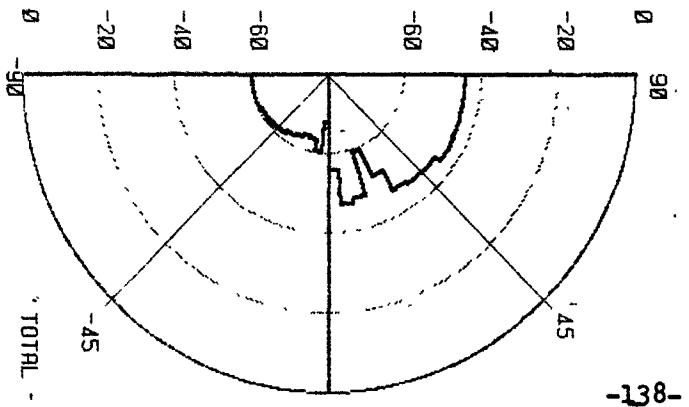


LRAPP

DEPTH IN METERS



NOISE (DB)



FREE 43 SUMMER

S 20 R 2625 F 696

1450 M.S. 1500 1550

LRFPP

DB LOSS

130 + + + + +

110 + + + + +

100

130  
110  
100  
80  
60  
40  
20

NOISE (KTSI)

0

2000

4000

6000

DEPTH IN METERS

0

20

40

60

80

100

120

140

160

180

200

220

240

260

280

300

ARRIVAL ANGLE

-20 + + + + +

0

+ + + + +

20

+ + + + +

40

+ + + + +

60

+ + + + +

80

+ + + + +

100

+ + + + +

120

+ + + + +

140

+ + + + +

160

+ + + + +

180

+ + + + +

200

+ + + + +

220

+ + + + +

240

+ + + + +

260

+ + + + +

280

+ + + + +

300

NOISE (DB)

0

20

40

60

80

100

120

140

160

180

200

220

240

260

280

300

-139-

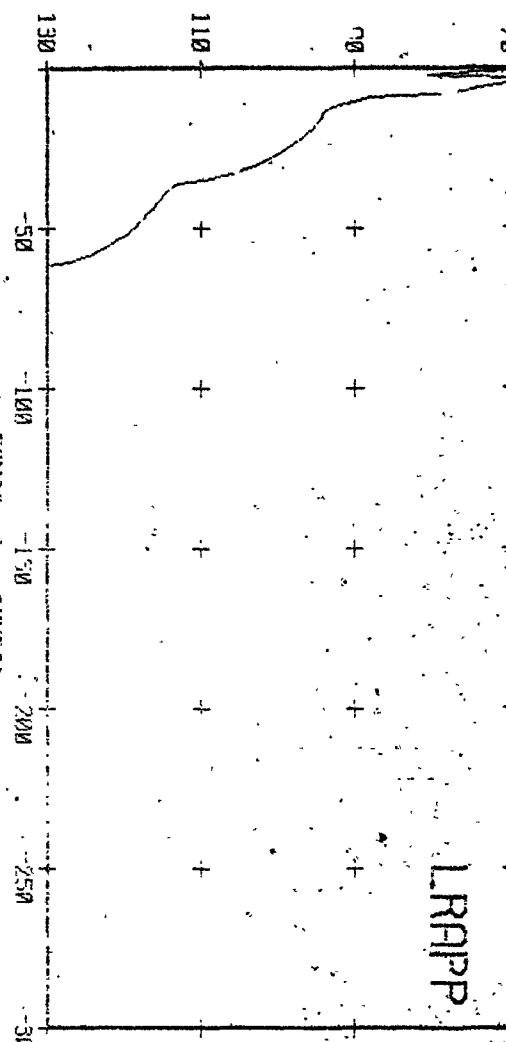
AREA 4B SUMMER

S SH R 2625-1 600

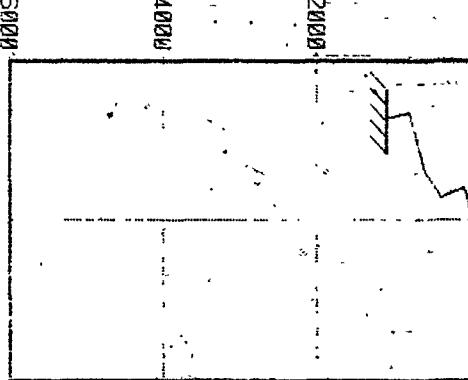
1450 M/S 1500 1550

LRAFP

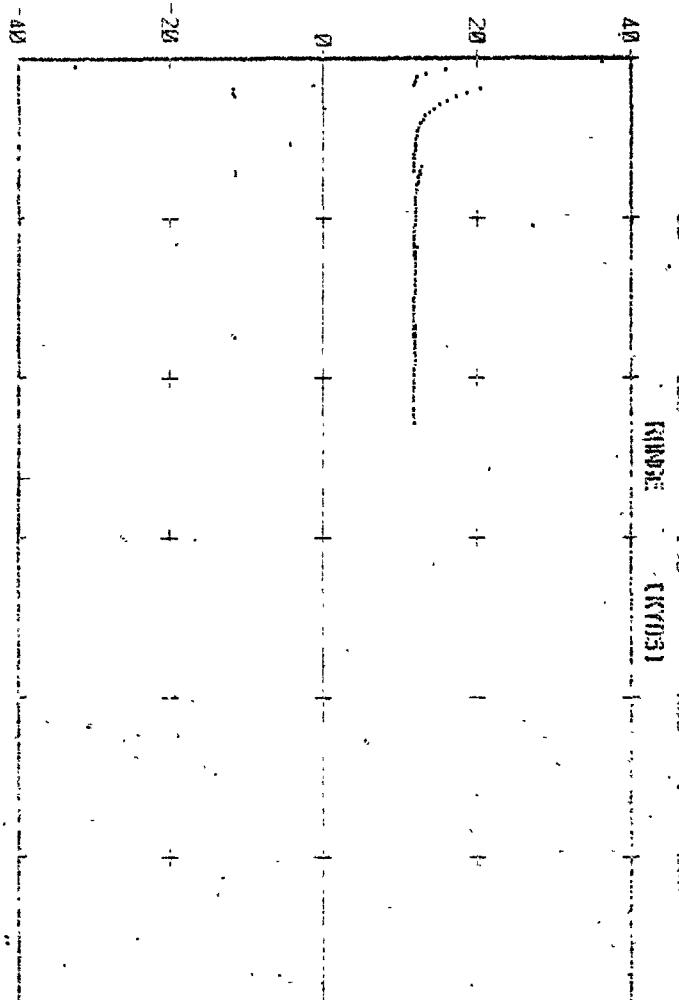
DB LOSS



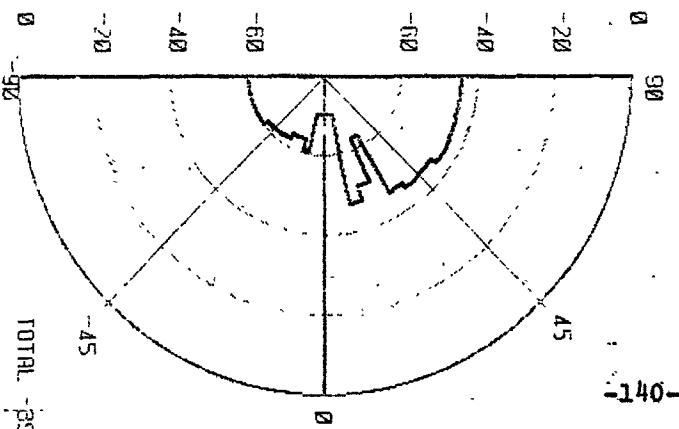
DEPTH IN METERS



ARRIVAL ANGLE



NOISE (DB)



TOTAL -39.2 dB

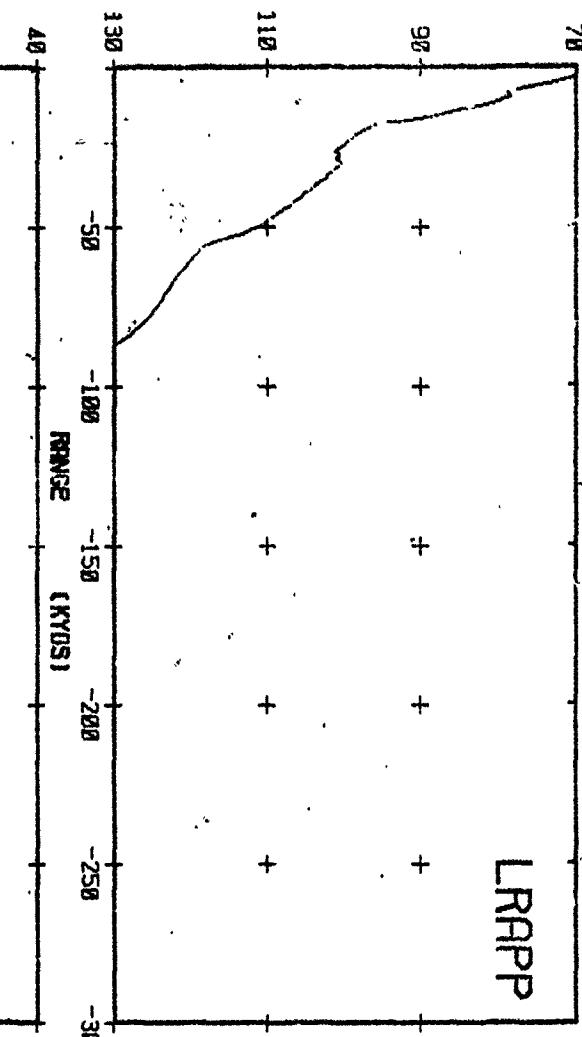
FREQ 48 SHMR

S 268 R 2625 F 688

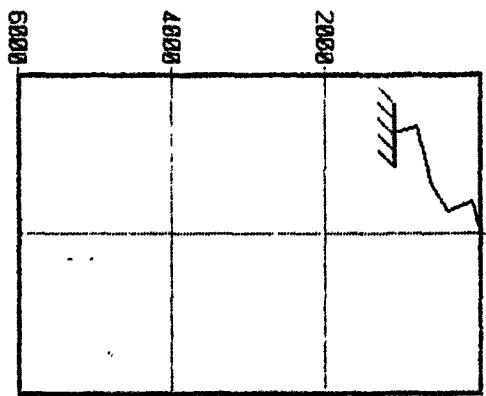
1450 m/s 1500 1550

LRAPP

DB LOSS



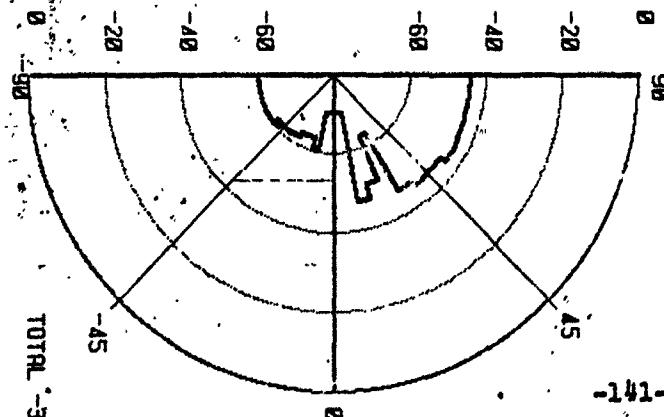
DEPTH IN METERS



ARRIVAL ANGLE



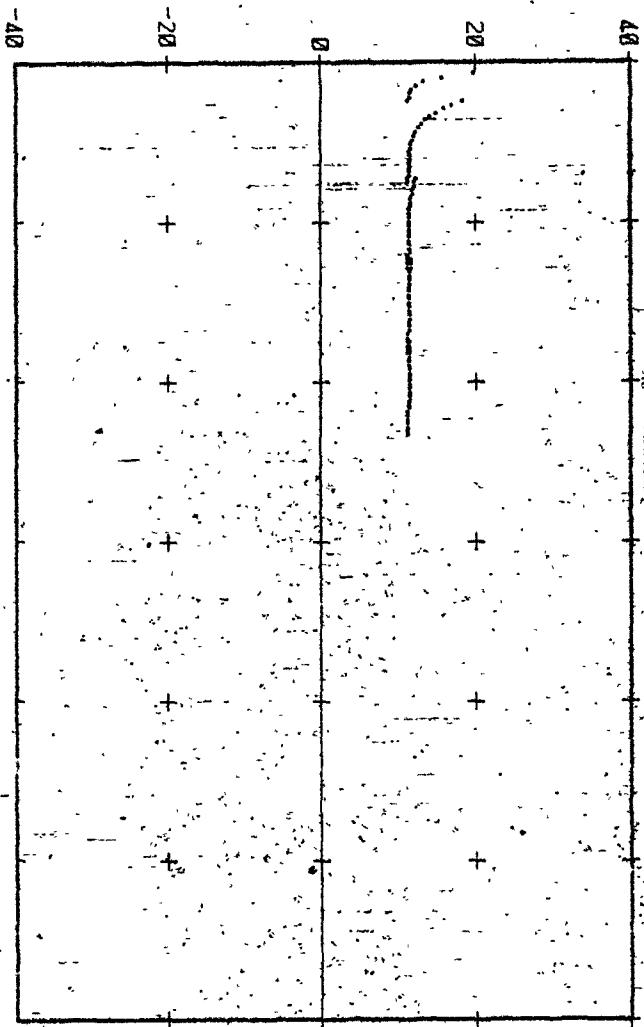
NOISE (DB)



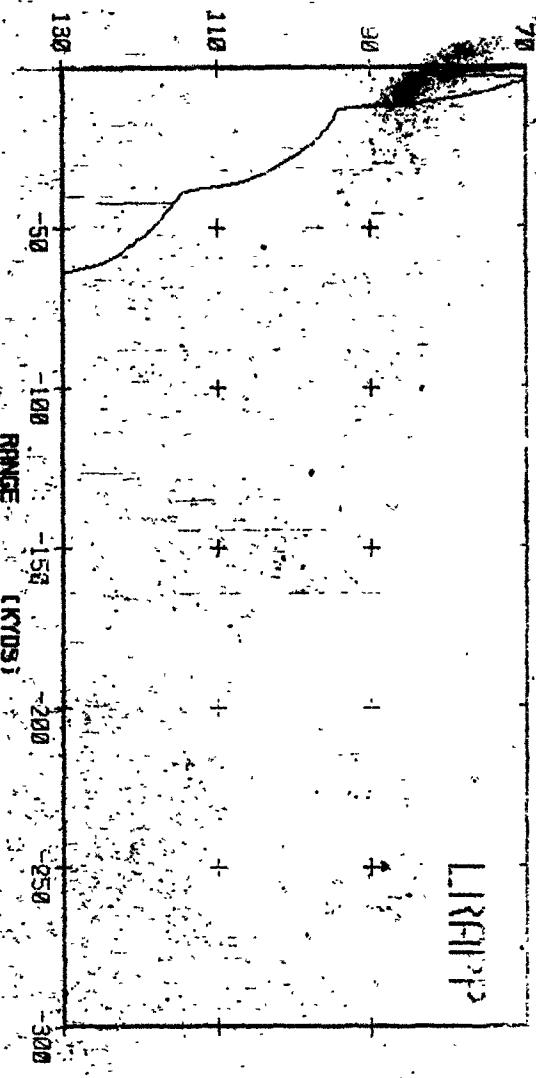
TOTAL -39.2 DB

-141-

### ARRIVAL ANGLE



### DB LOSS

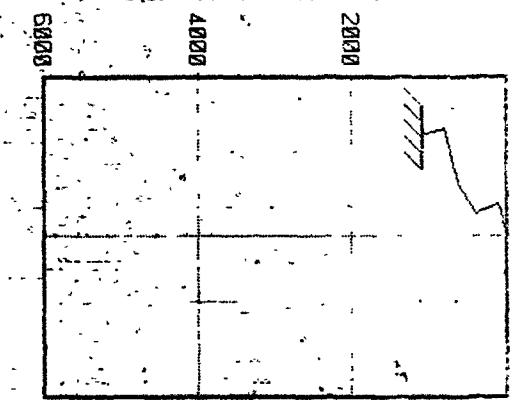


ARR 4B SUMMER

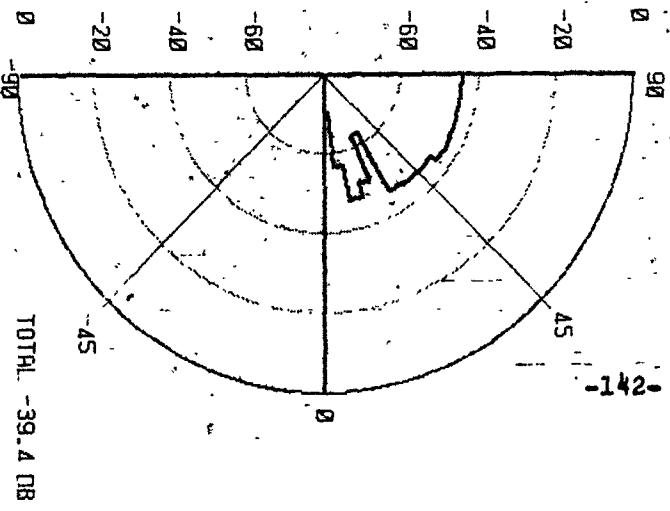
S 28 R 35S9 F 690

1450 M/S 1500 1550

### DEPTH IN METERS



### NOISE (DB)

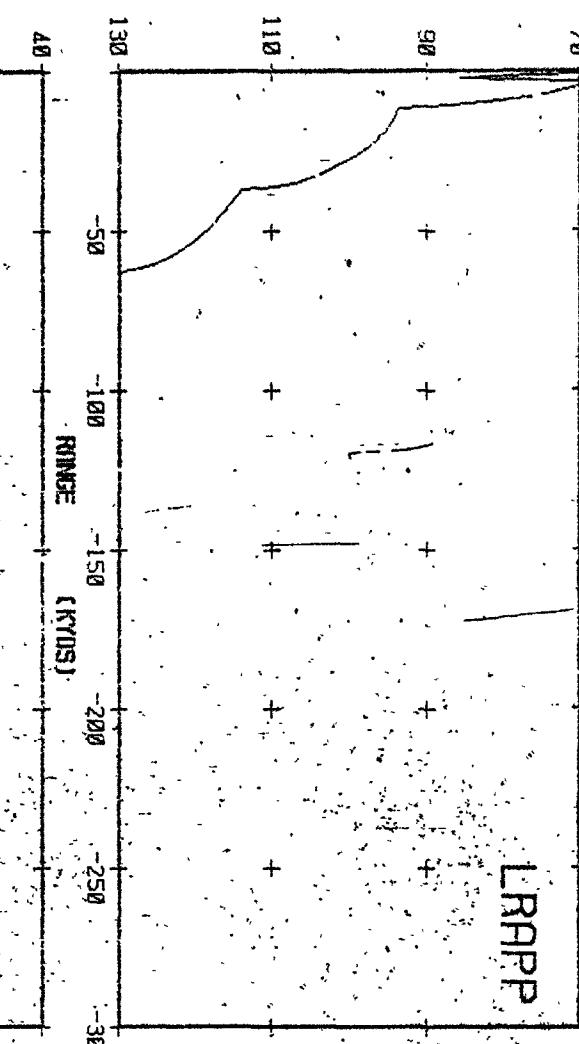


FRIER AB SUMMER

S 58 R 3509 E 600

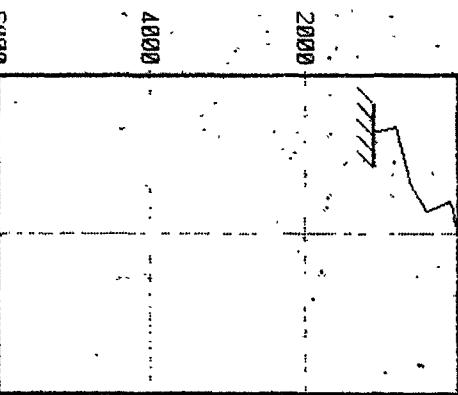
1450 M/S 1500 1550

DB LOSS

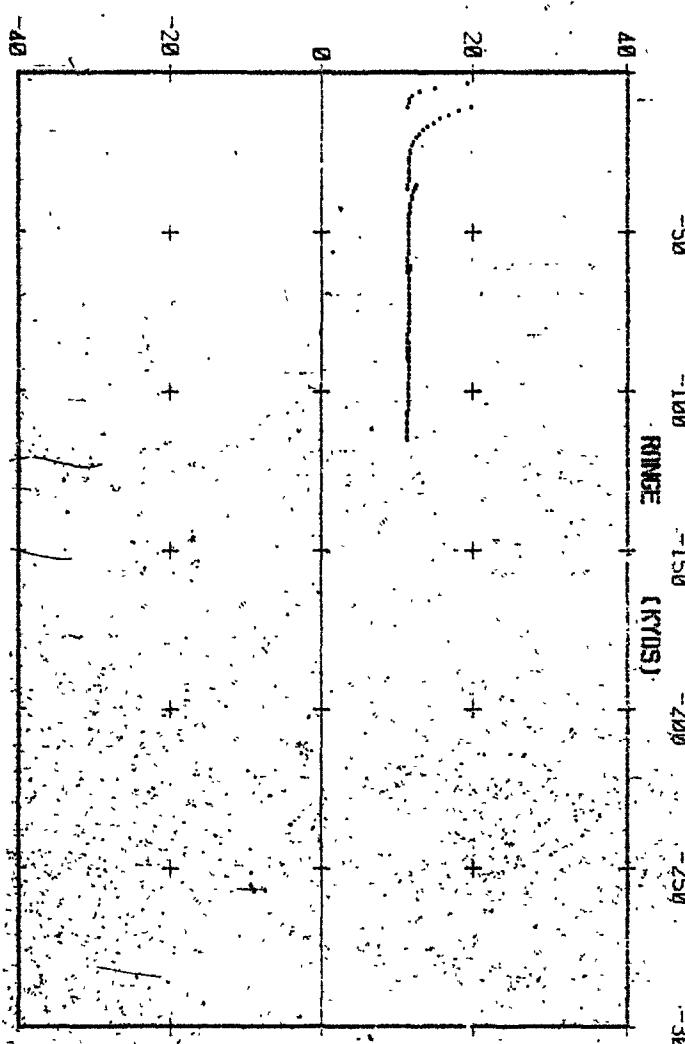


LRAPP

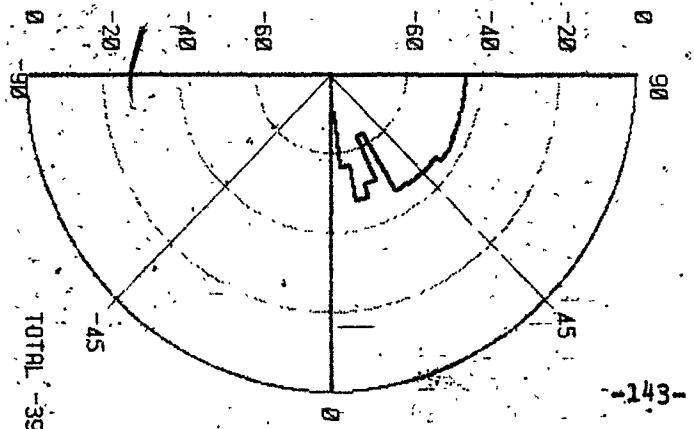
DEPTH IN METERS



ARRIVAL ANGLE



NOISE (DB)



TOTAL -39.4 DB

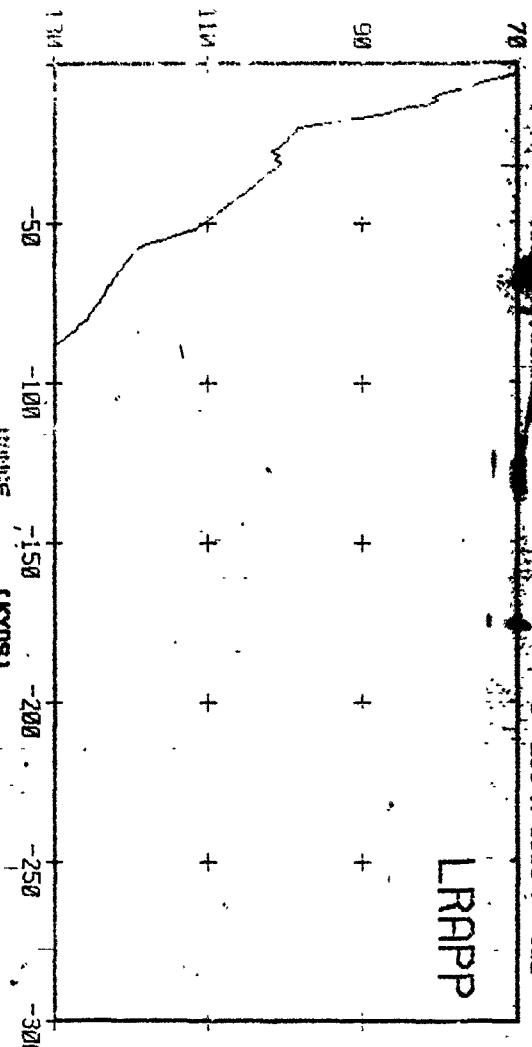
-143-

S 268 R 359 F 600

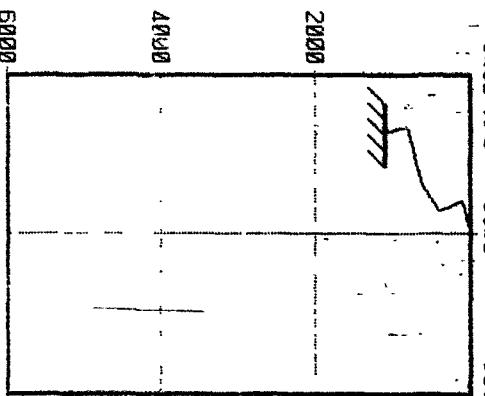
1450 N/S 1500 1550

LRAPP

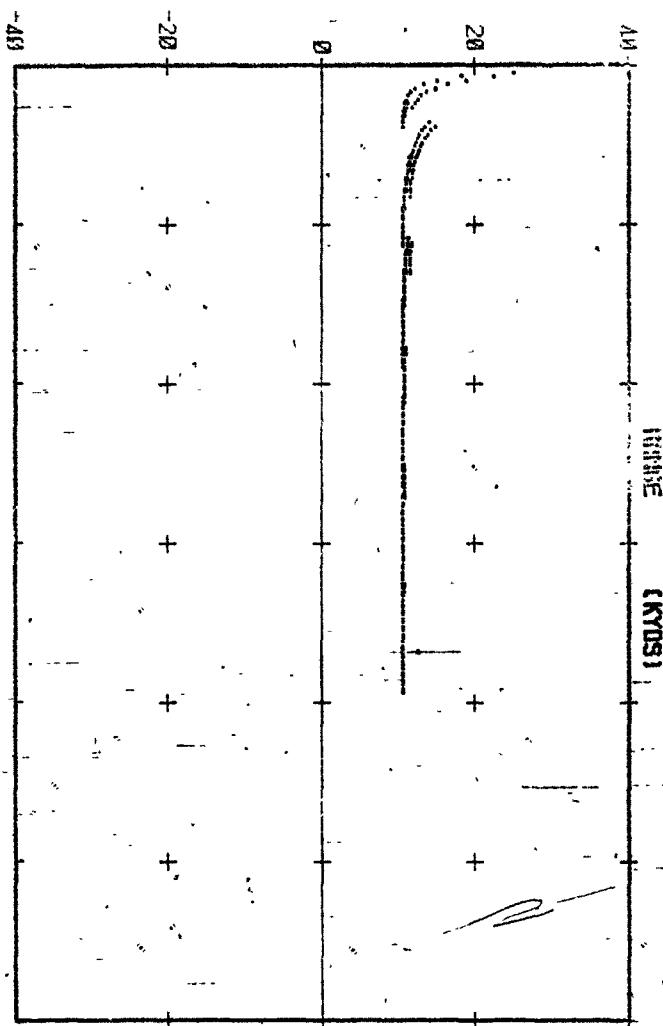
DB LOSS



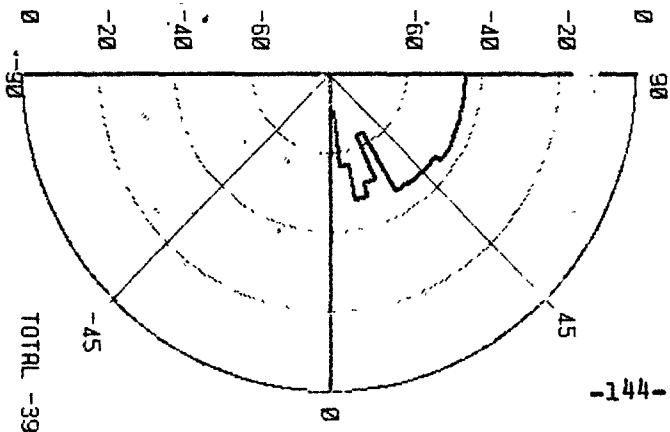
DEPTH IN METERS



ARRIVAL ANGLE



NOISE (DB)



TOTAL -39.4 DB

-144-

AREA AB SUMMER

S 28° R 60° F 300

1450 m/s

1500

1550

DB LOSS

110

90

70

50

30

10

0

LRAAPP

130

110

90

70

50

30

10

0

RR

EE

NN

SS

W

E

N

S

W

E

N

S

W

E

N

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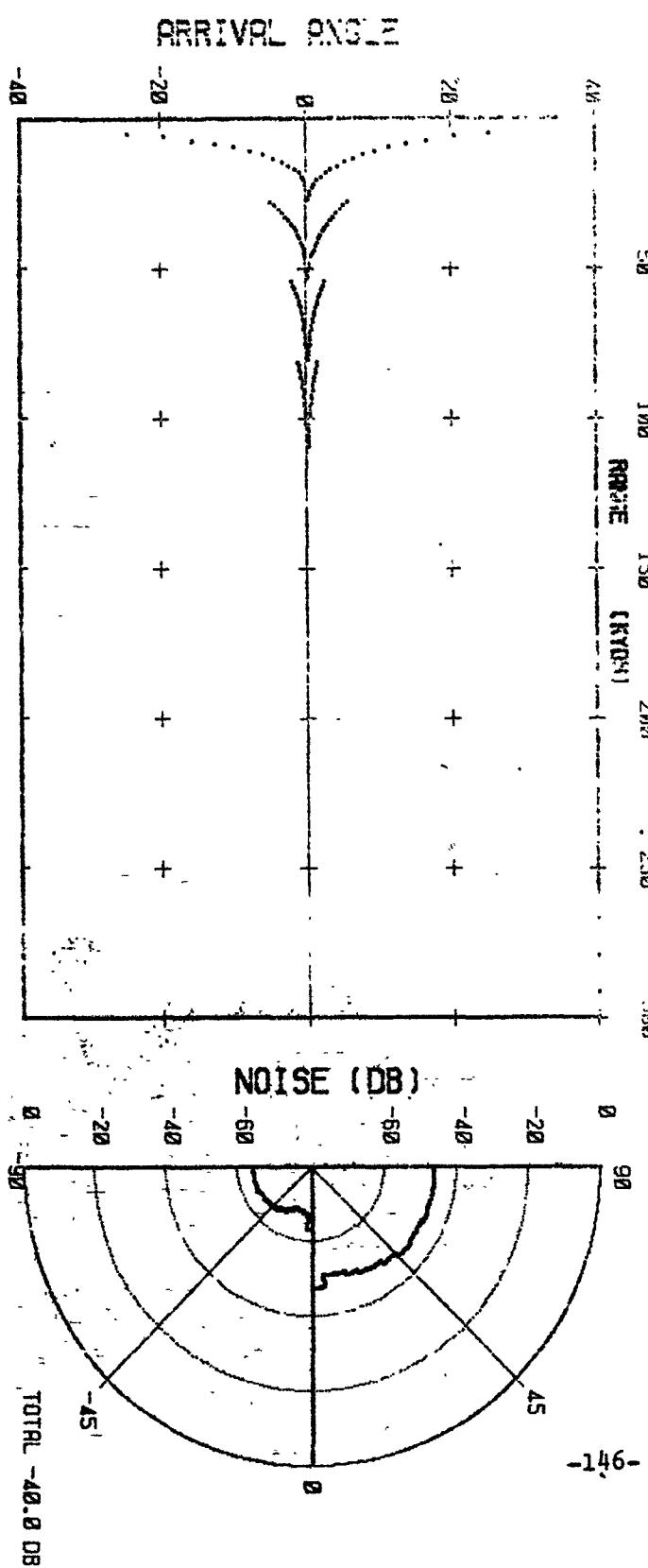
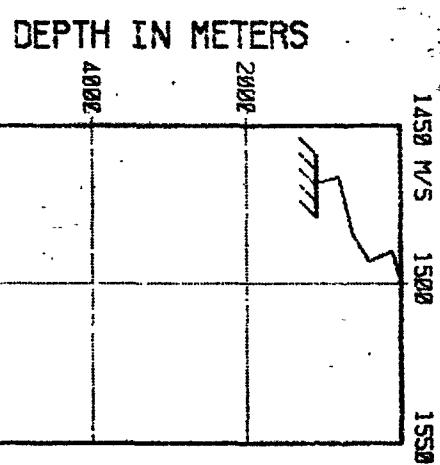
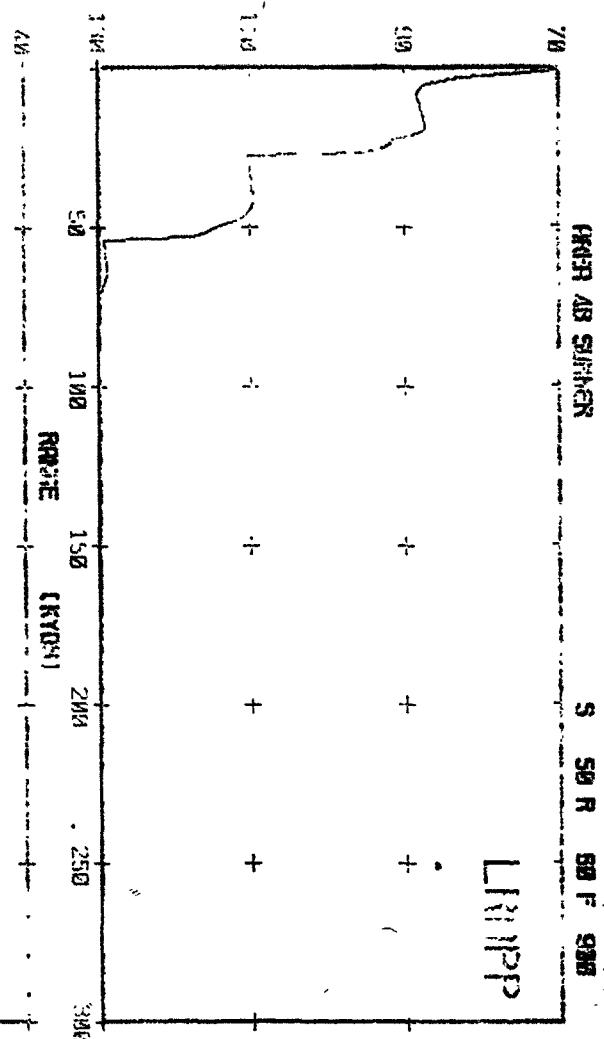
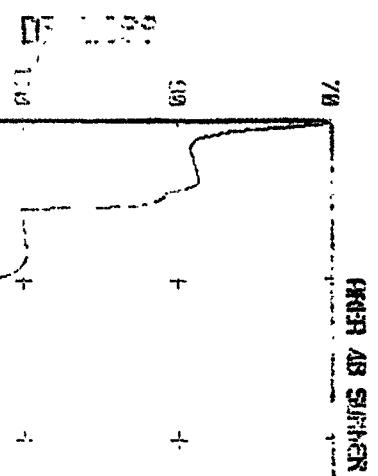
N

S

W

E

N</



70

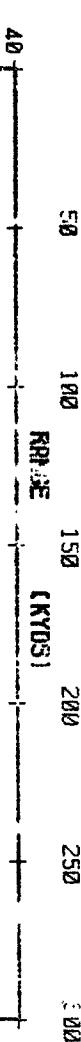
PINE IS SLIDER

S 268 R 68 F J31

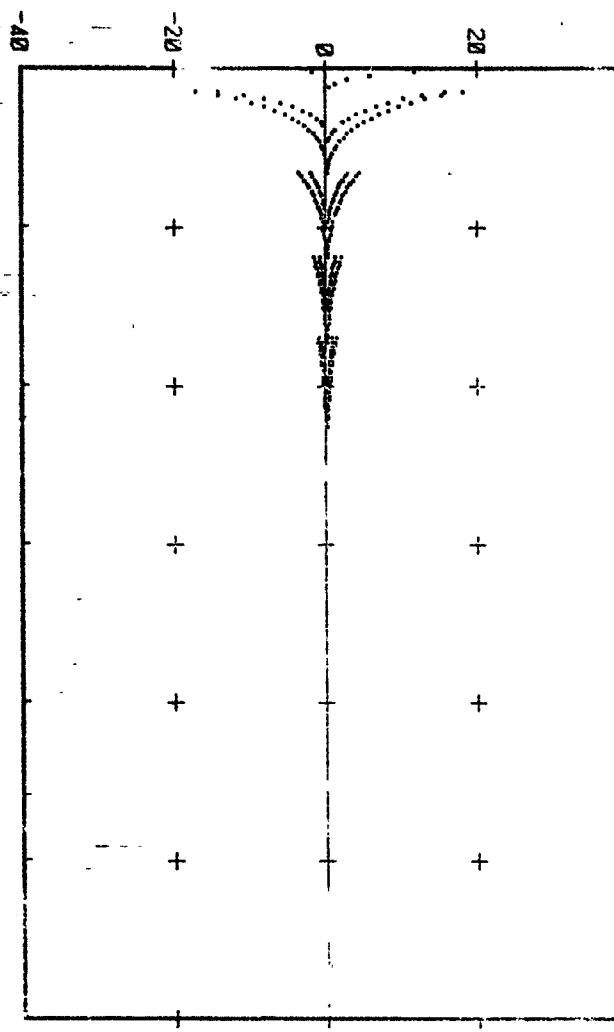
1450 M/S 1500 1550

LHCIP

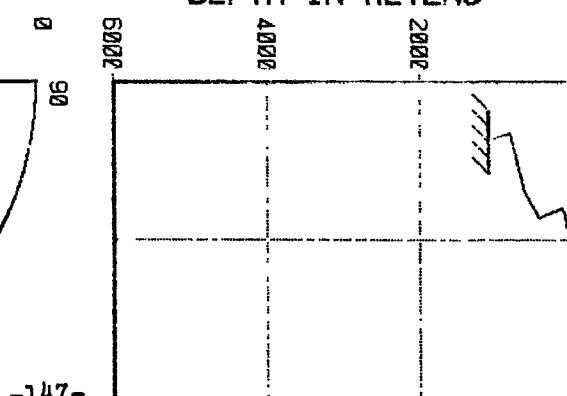
## DB LOSS



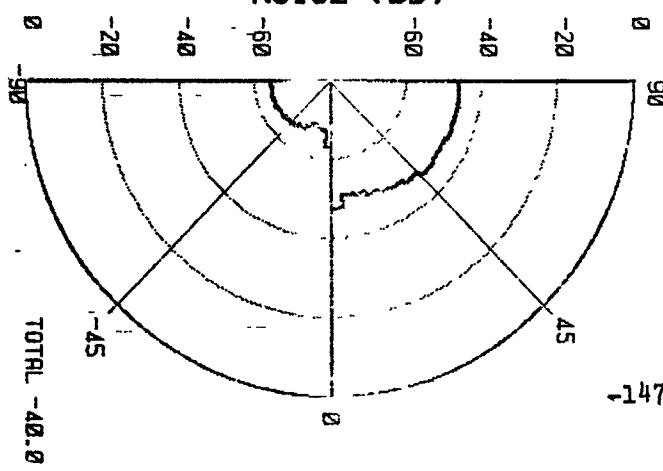
## ARRIVAL ANGLE



## DEPTH IN METERS



## NOISE (DB)



TOTAL -40.0 DB

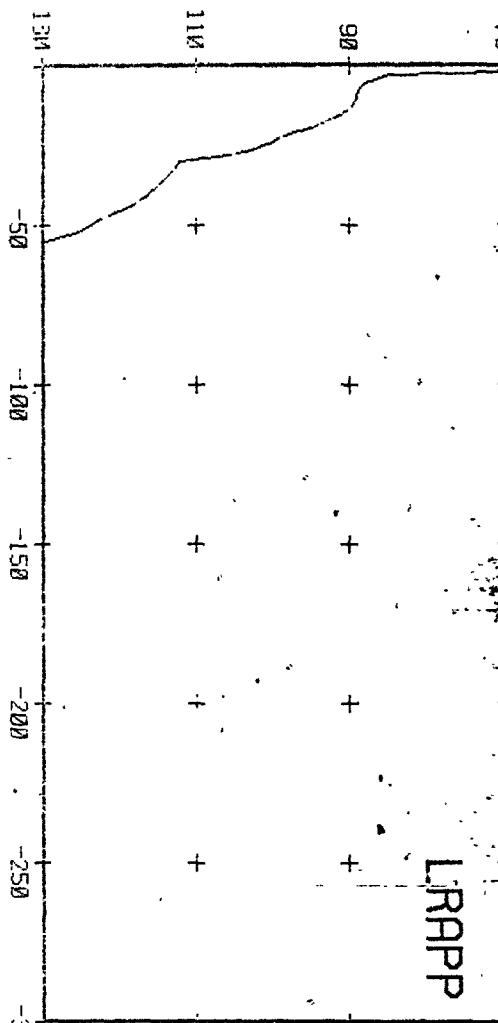
AREA 4B SURFER

S 28 R 105 F 900

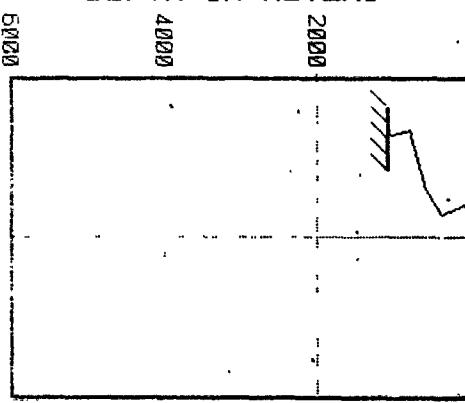
1450 M/S 1500 1550

LRAPP

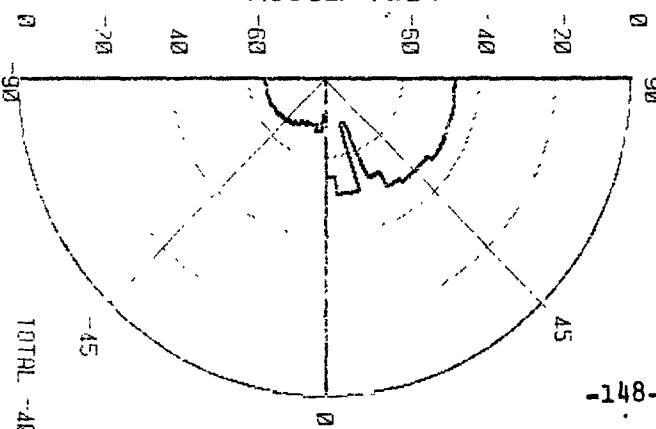
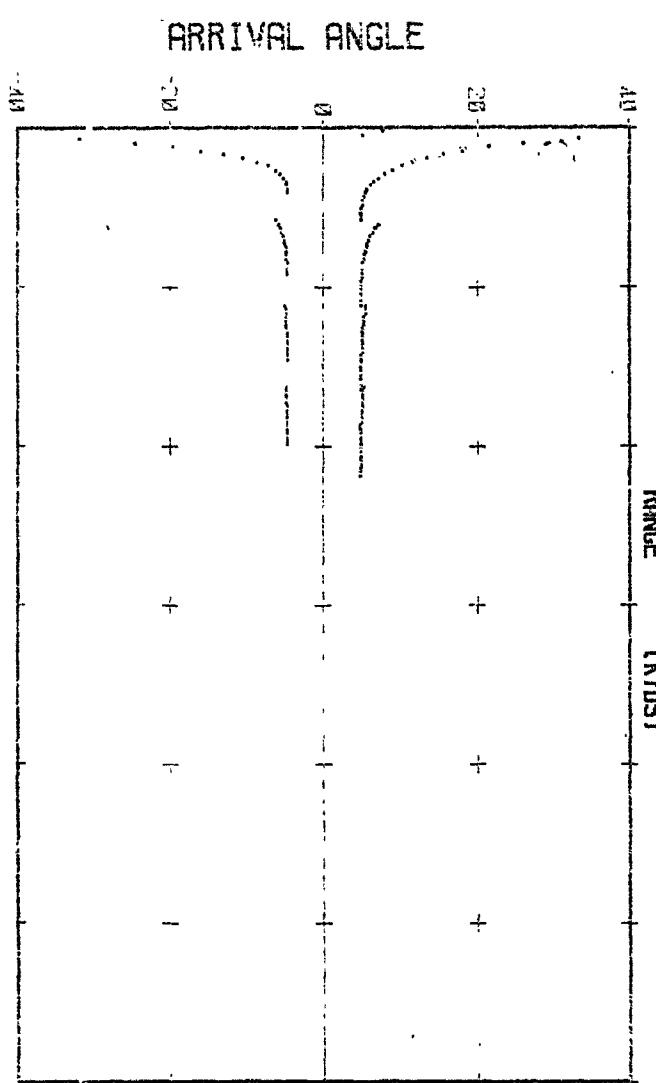
DB LOSS



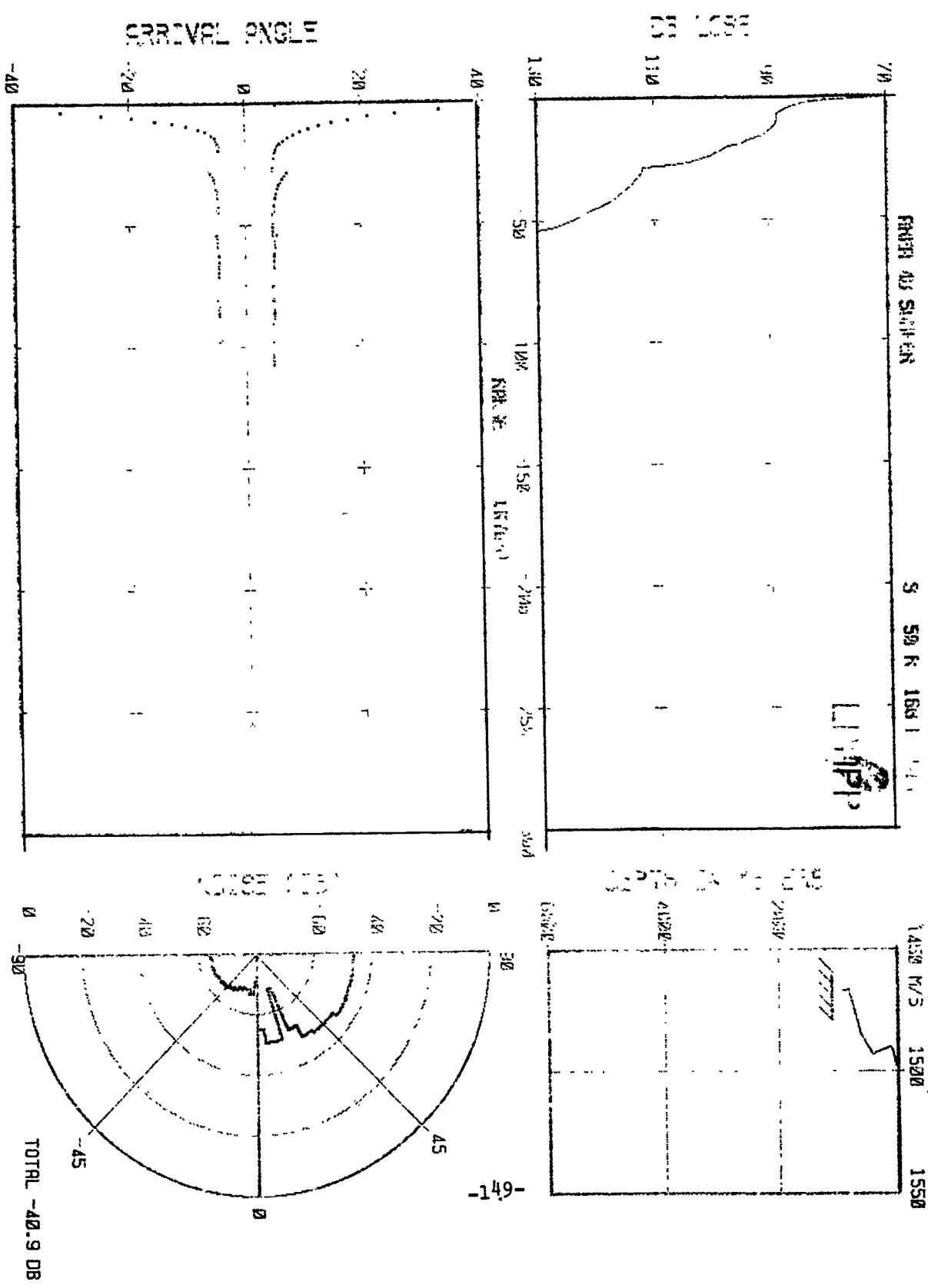
DEPTH IN METERS



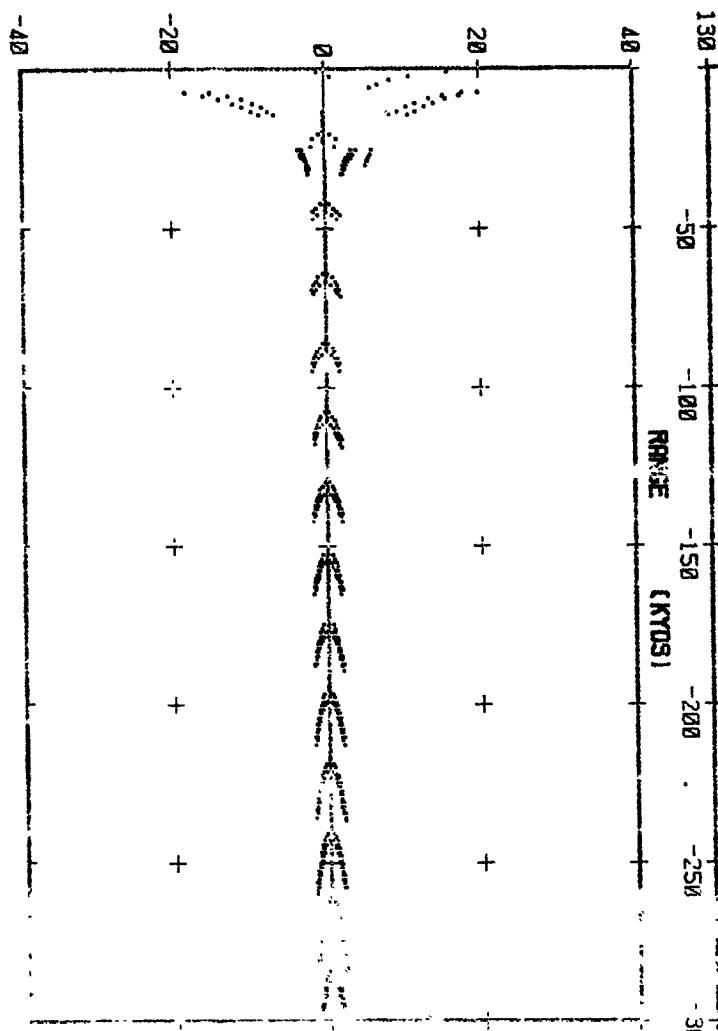
NOISE (DB)



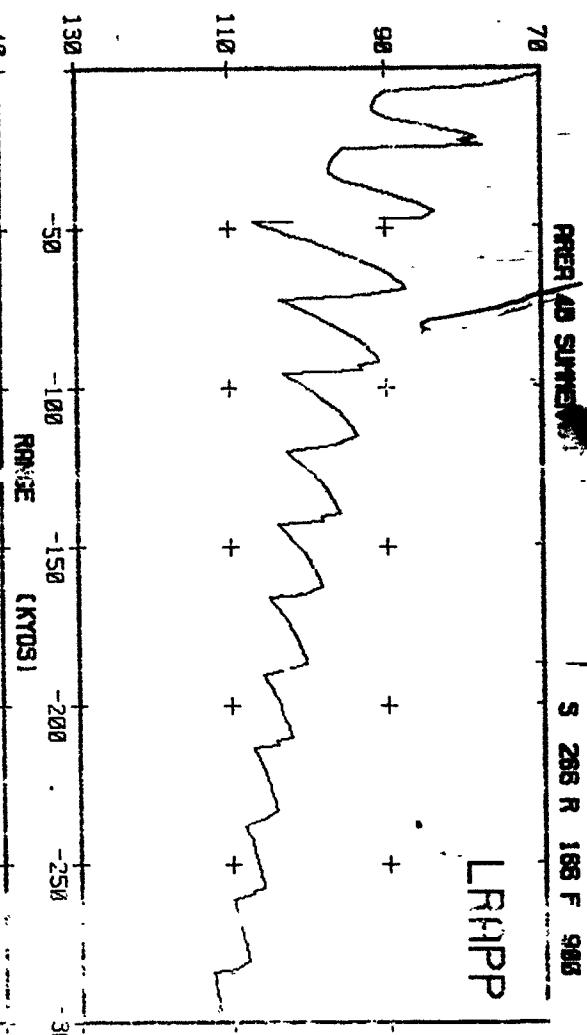
-148-



### ARRIVAL ANGLE



### DB LOSS



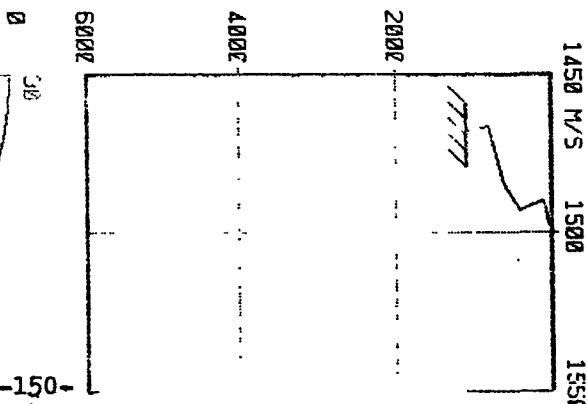
FREE AIR SURFACE

S 265 R 168 F 908

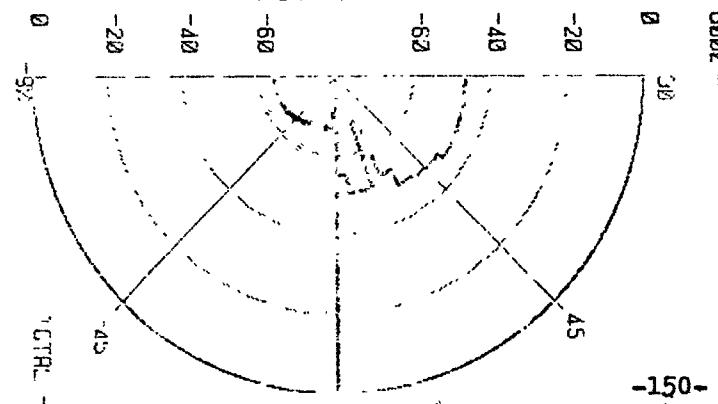
LRHPP

1450 M/S 1500 1550

### DEPTH IN METERS



### NOISE (DB)



0  
-20  
-40  
-60  
-80

0  
-20  
-40  
-60  
-80

0  
-20  
-40  
-60  
-80

0  
-20  
-40  
-60  
-80

0  
-20  
-40  
-60  
-80

0  
-20  
-40  
-60  
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-40  
-60  
-80

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-20  
-40  
-60  
-80

0  
-20  
-40  
-60  
-80

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PINGER AB SUMER

S 28 R 300 F 900

1450 M/S 1500 1550

DB LOSS

LRAAPP

110

90

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-150

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-151-

DEPTH IN METERS

2000

4000

6000

ARRIVAL ANGLE

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-20

-40

-60

-80

-100

-120

-140

-160

-180

-200

-220

NOISE (DB)

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-40

-60

-80

-100

-120

-140

-160

-180

-200

10

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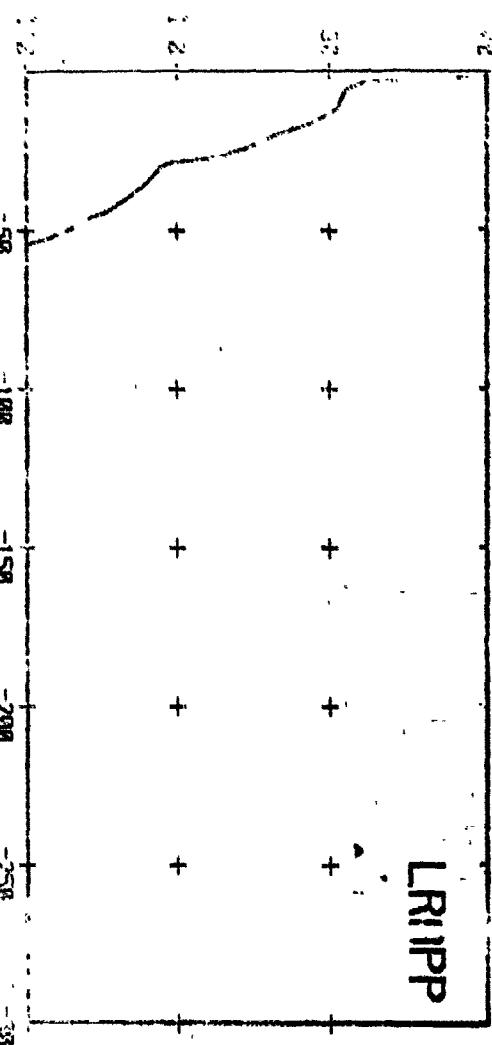
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TOTAL -41.0 DB

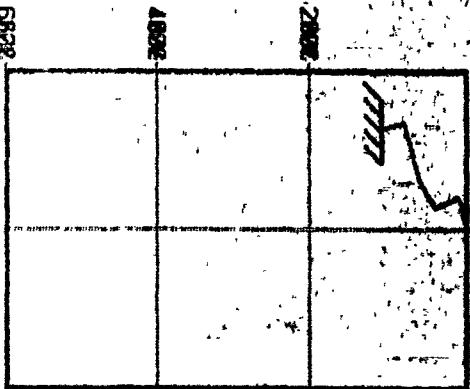
AREA AS SUMMER

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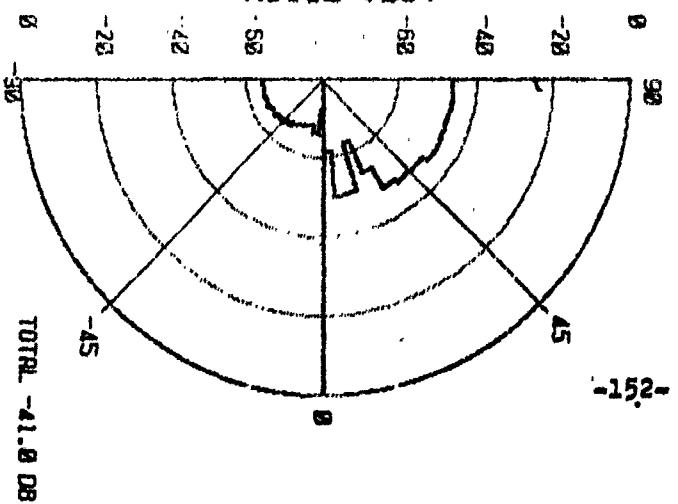
LRIIPP



DEPTH IN METERS



NOISE (DB)



78

AREA AB SUMMER

S 268 R 300 F 900

1450 M/S

1500

1510

LIMPP

DB LOSS

90

110

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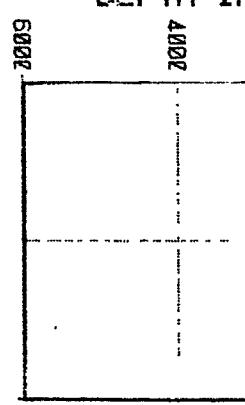
B

ARRIVAL ANGLE

NOISE (DB)



DEPTH IN METERS



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DATA AS SHOWN

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-20 R 1000 F 900

1450' IVS

1500

1550

LRAPP

DB LOSS

130

-50

-100

-150

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-250

-300

RANGE (KTS)

DEPTH IN METERS

2000

4000

6000

-154

ARRIVAL ANGLE

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-80

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-120

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-400

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NOISE (DB)

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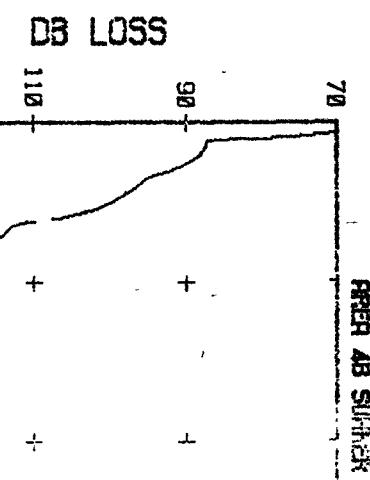
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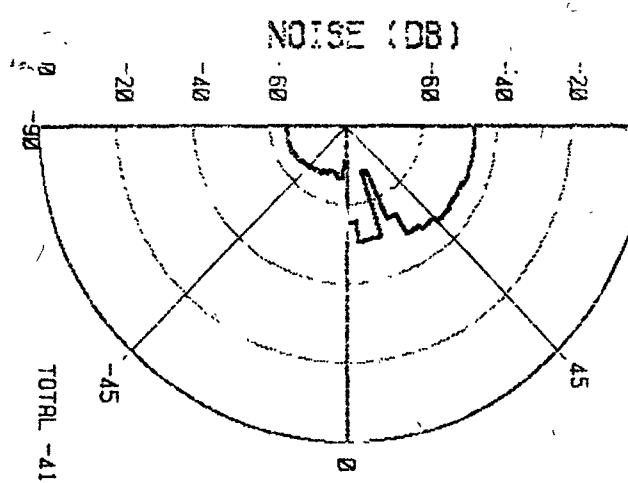
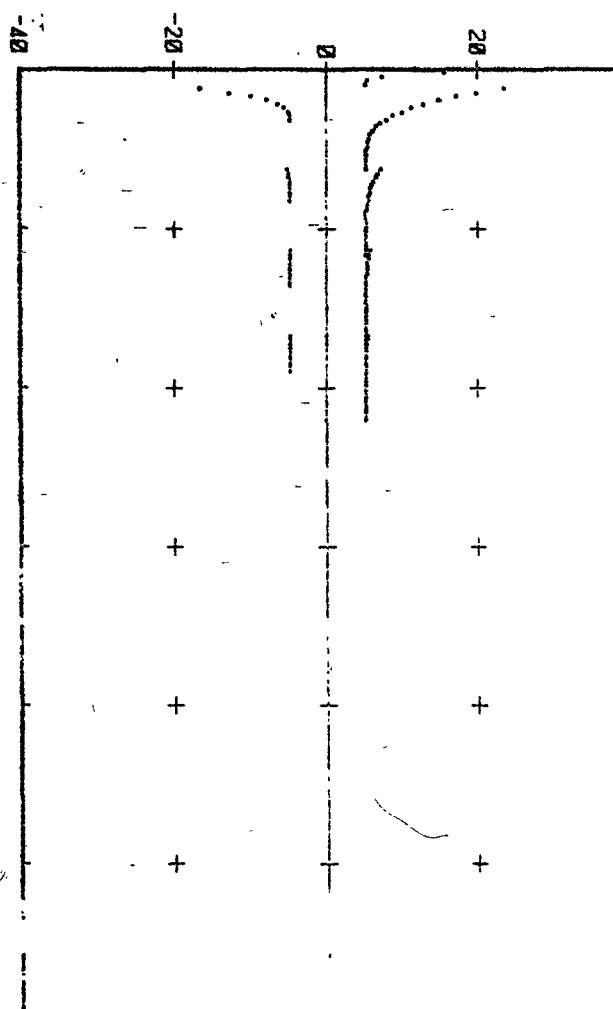
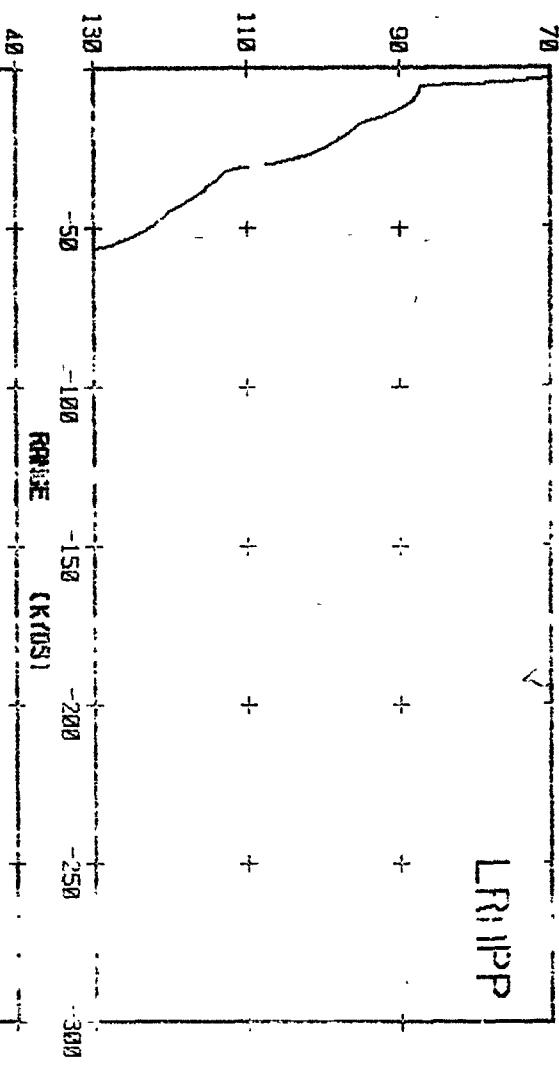
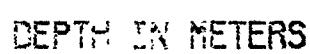
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FRIER AB SÜDICK

S 50 R 1962 F 533

1450 MV<sub>3</sub> 1500 · 1550



REER 48 SUMMER

S 286 R 1000 F 900

1450 M/S 1500 1500

LRAPP

DB LOSS

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6000

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1000

DEPTH IN METERS

200  
100

ARRIVAL ANGLE

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NOISE (DB)

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TO/H 21.0 DB

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AREA AB SUMMER

S

LRAPP

1450

M/S

1500

1550

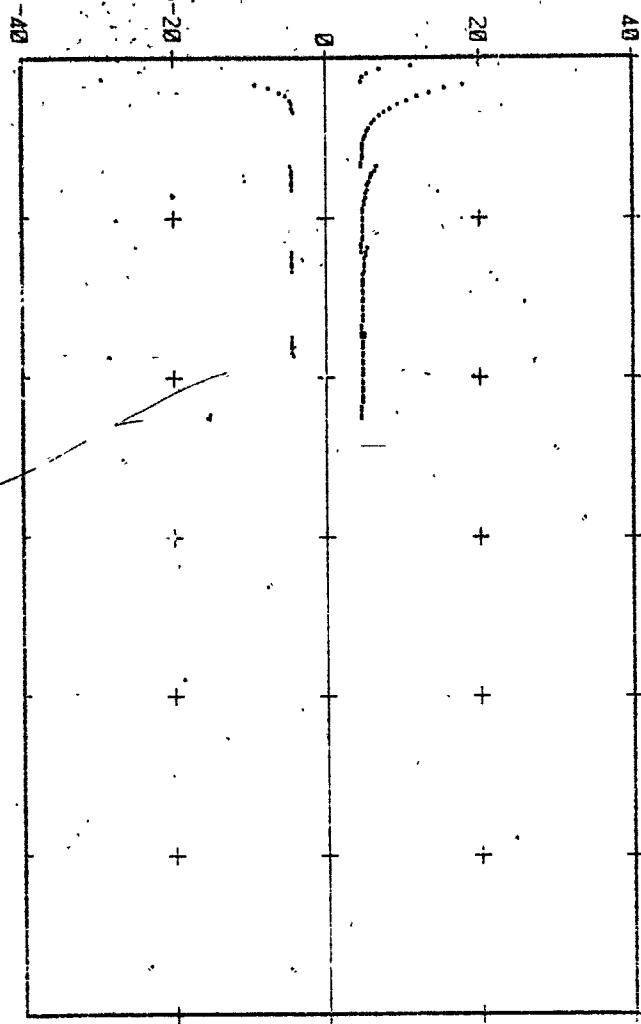
## DB LOSS



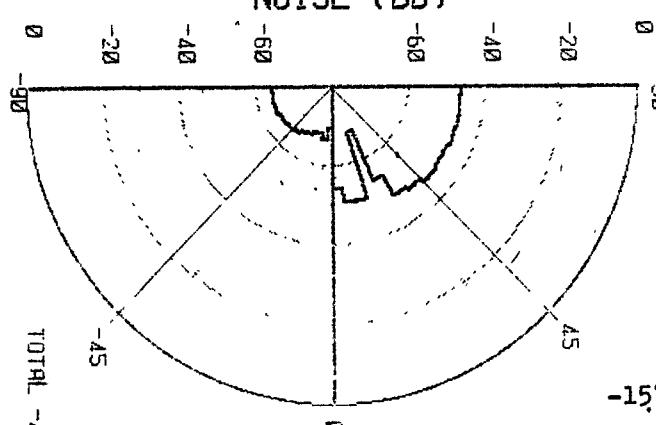
## DEPTH IN METERS

2000  
4000  
6000

## ARRIVAL ANGLE

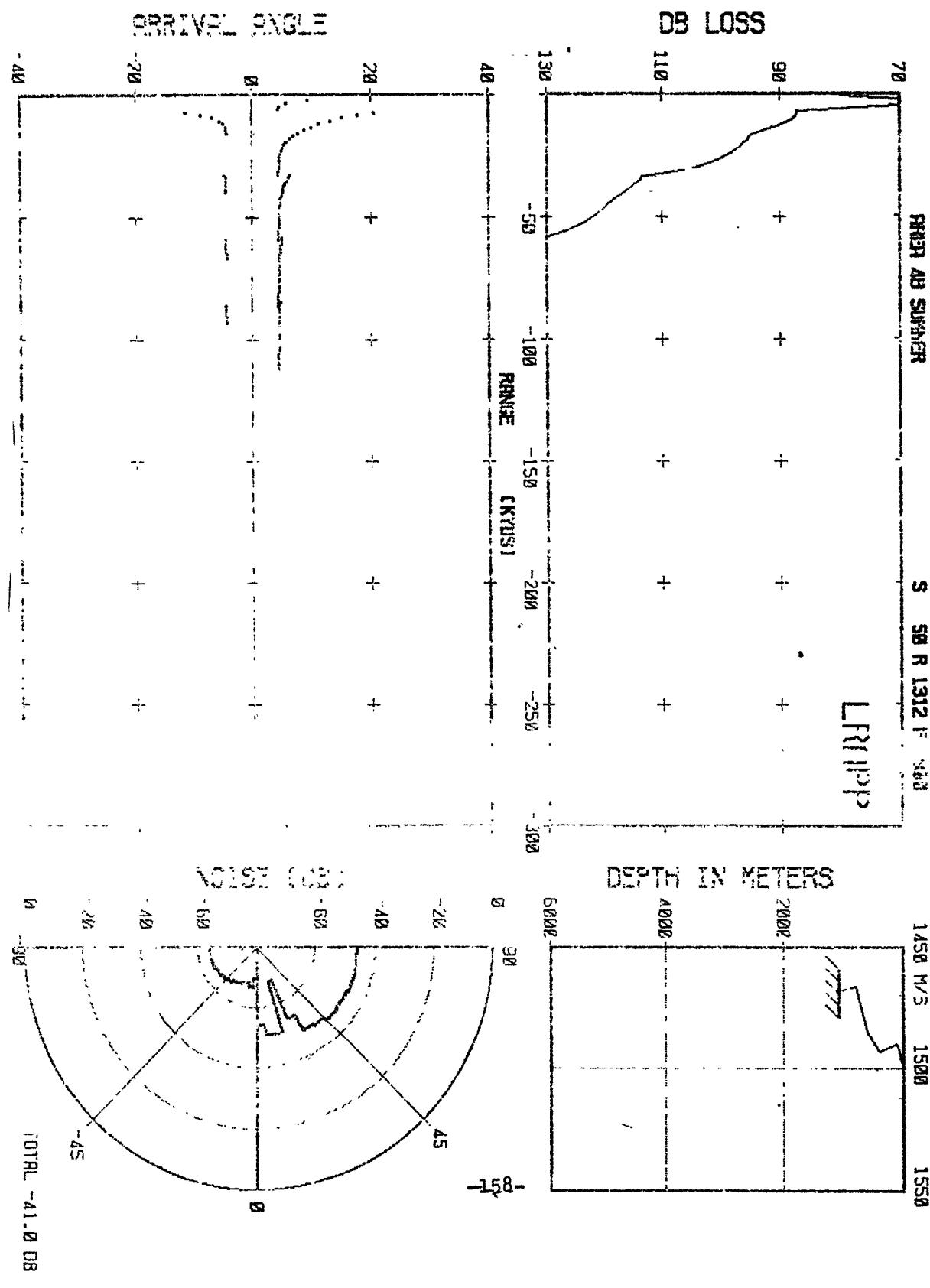


## NOISE (DB)



-157-

TOTAL -41.0 DB



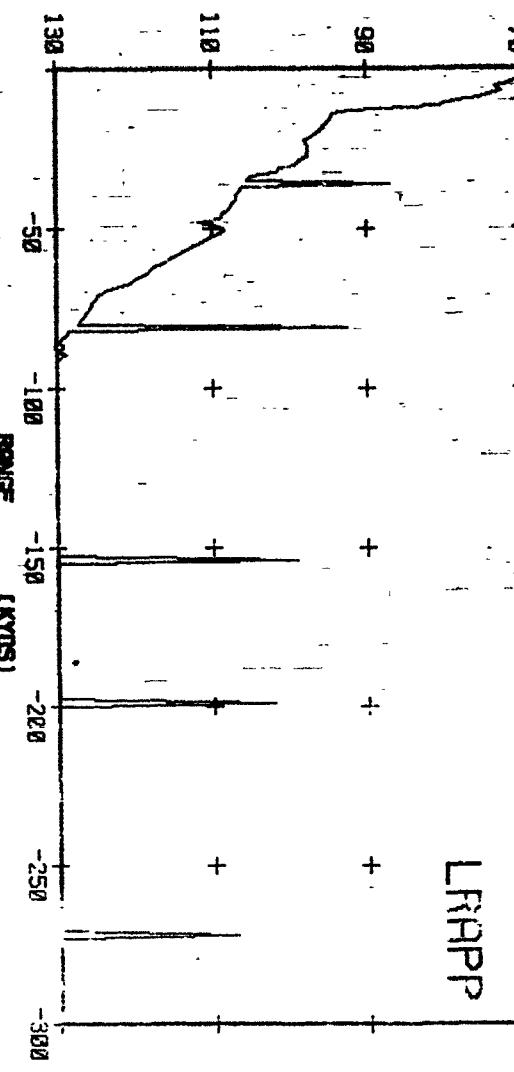
AREA 48 SUMMER

S 268 R 1312 F 908

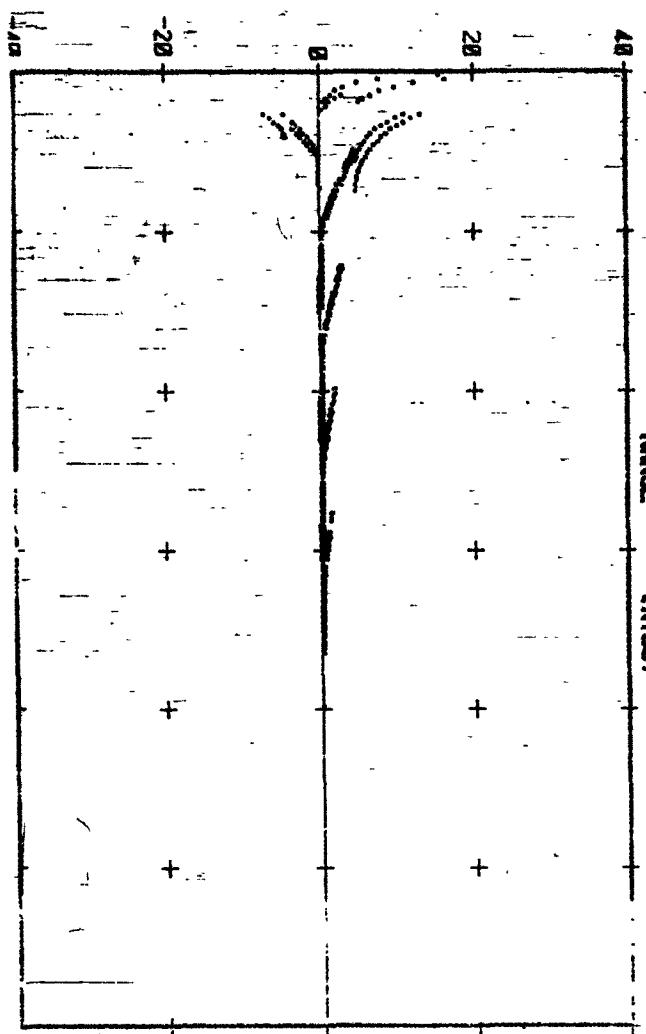
1450 M 530 15

LFRAPP

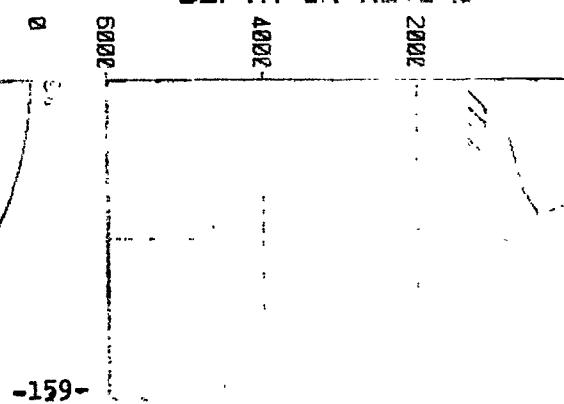
### DB LOSS



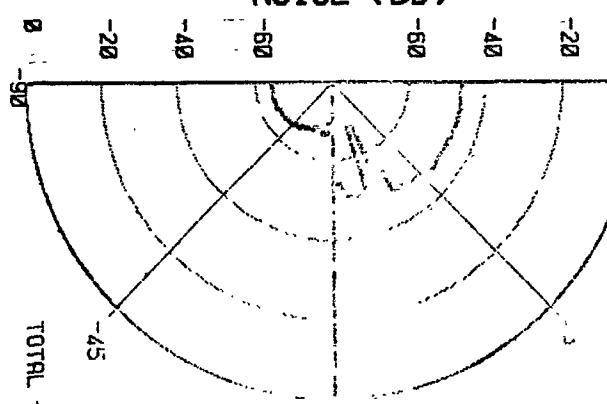
### ARRIVAL ANGLE



### DEPTH IN METERS



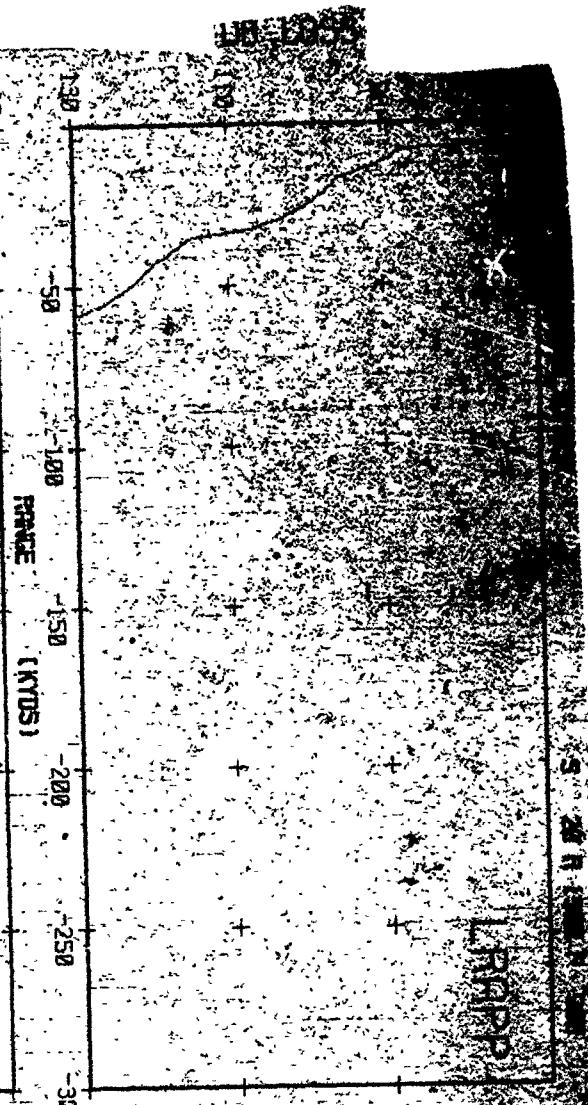
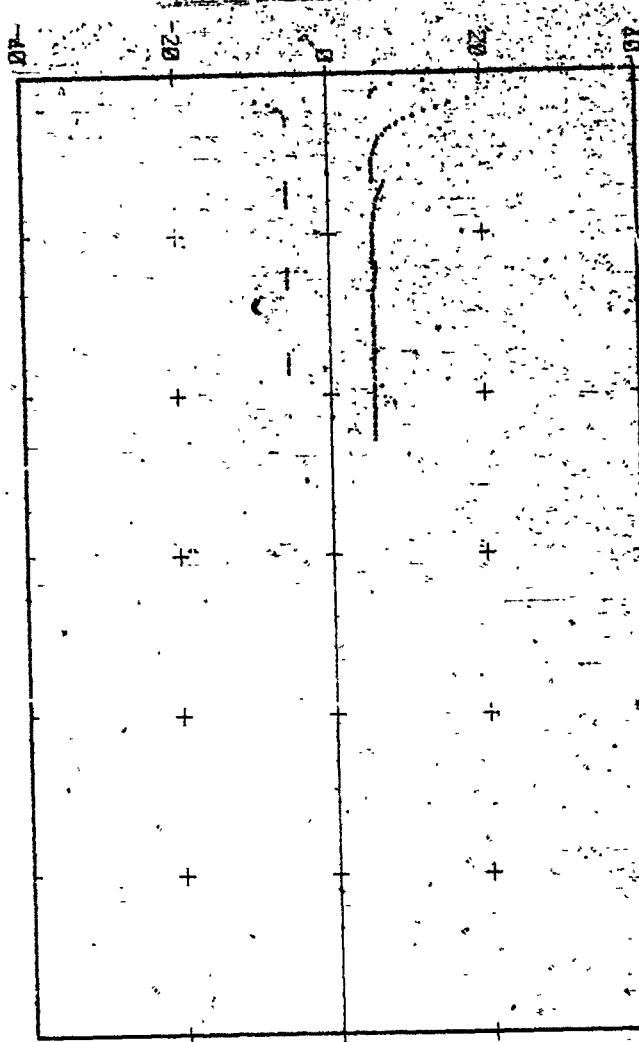
### NOISE (DB)



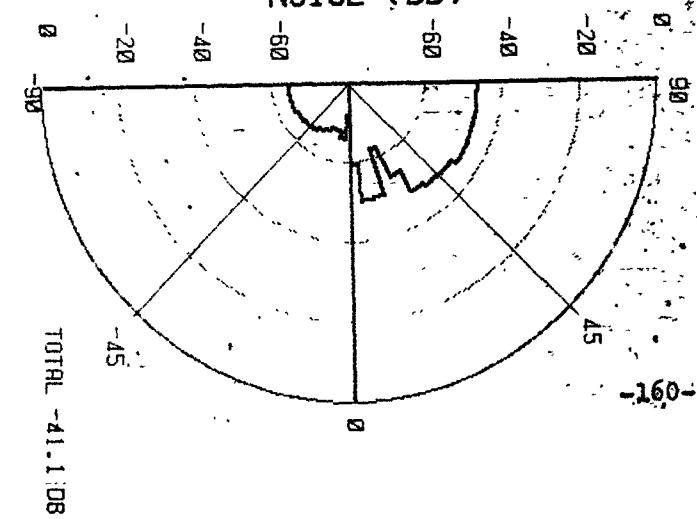
TOTAL -41.0 DB

-159-

### ARRIVAL ANGLE



### NOISE (DB)



### DEPTH IN METERS



79

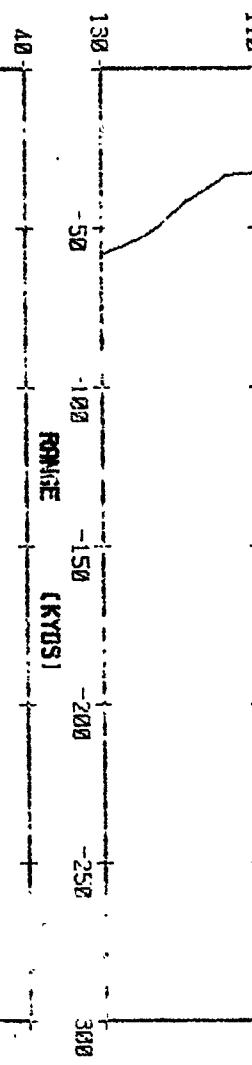
AREA 4B SUMMER

S 50 R 1500 E 384

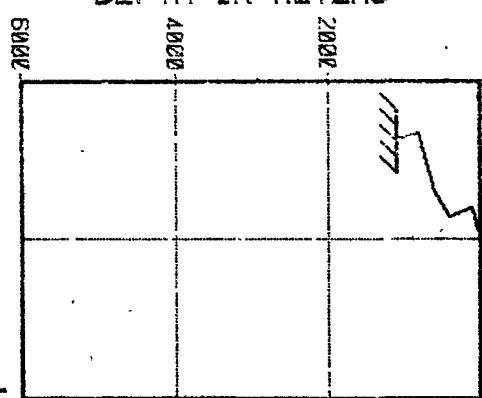
1450 M/S 1500 1550

LRRP

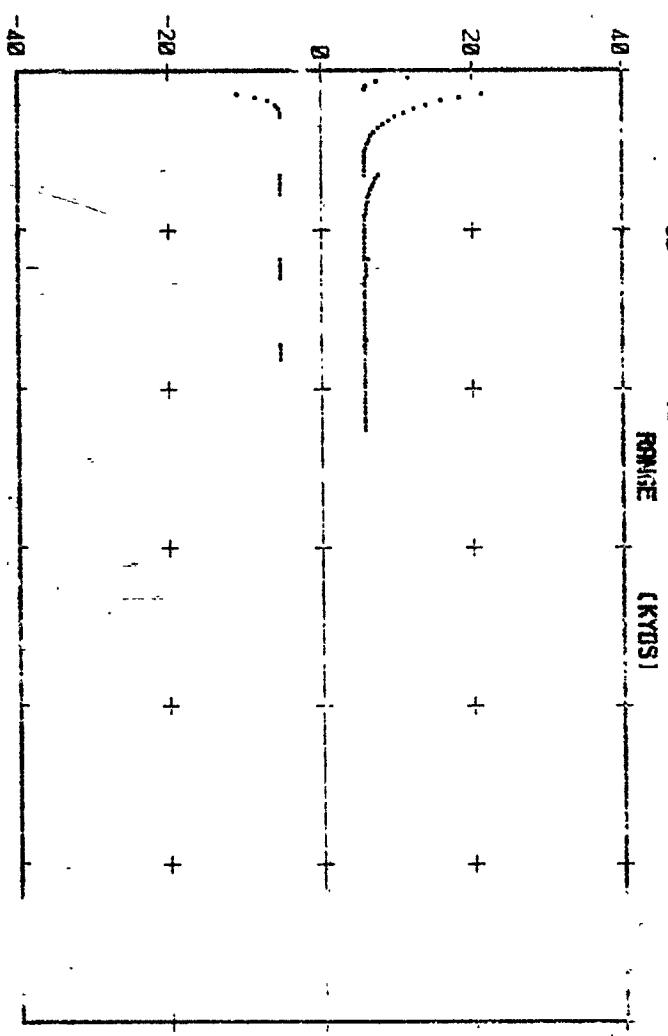
## DB LOSS



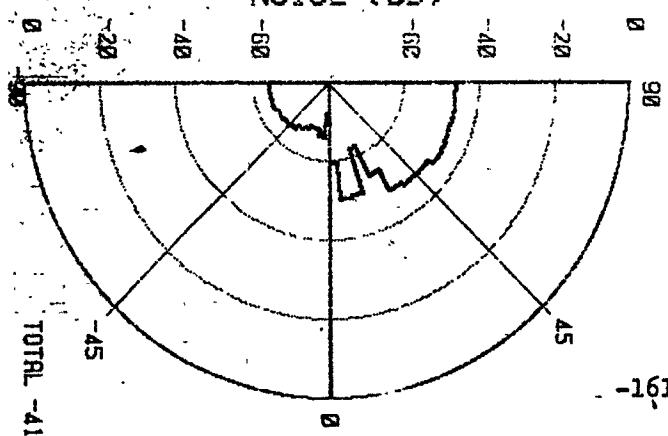
## DEPTH IN METERS



## ARRIVAL ANGLE



## NOISE (DB)



TOTAL -41.1 DB

-161-

70

RIVER AB SUMMER

S 266 R 1500 F 360

1450 M/S 1520 1550

LRLPP

DB LOSS

90

+

+

+

+

+

+

+

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+

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+

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+

+

+

+

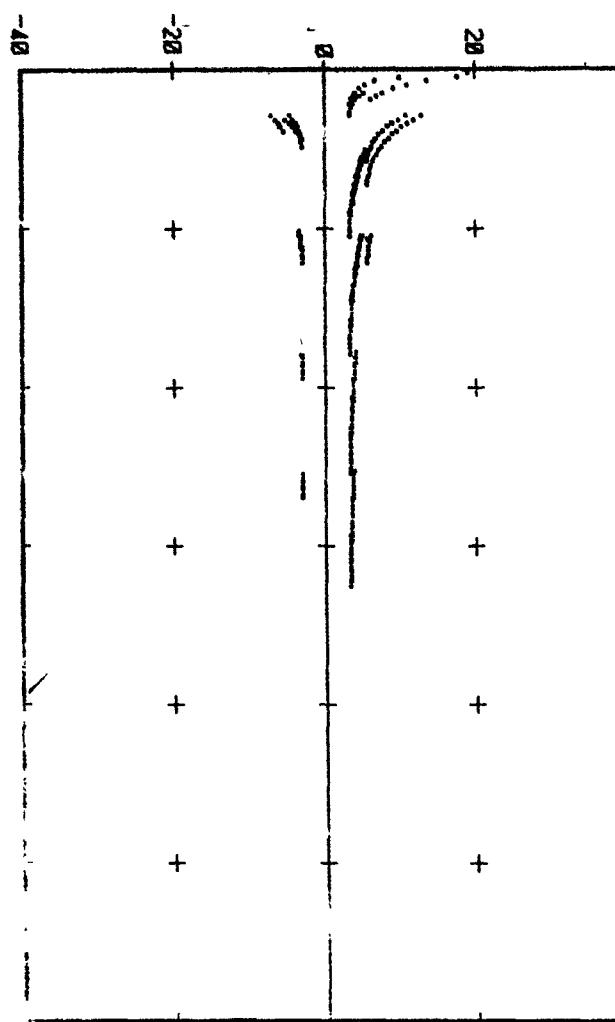
+

130  
110  
90  
70  
50  
30  
10  
0

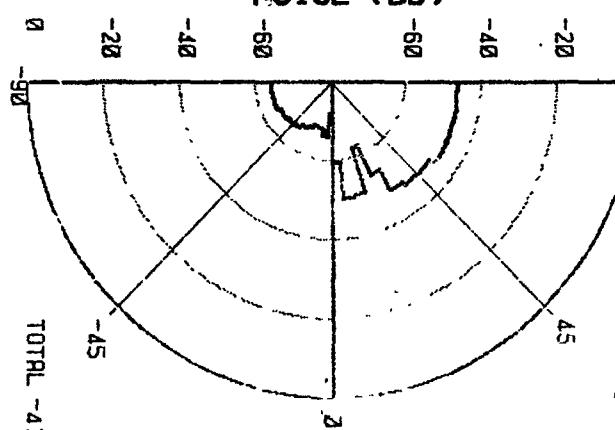
6000  
4000  
2000  
0

DEPTH IN METERS

ARRIVAL ANGLE



NOISE (DB)



-162-

TOTAL -41.1 DB

ARRIVAL ANGLE

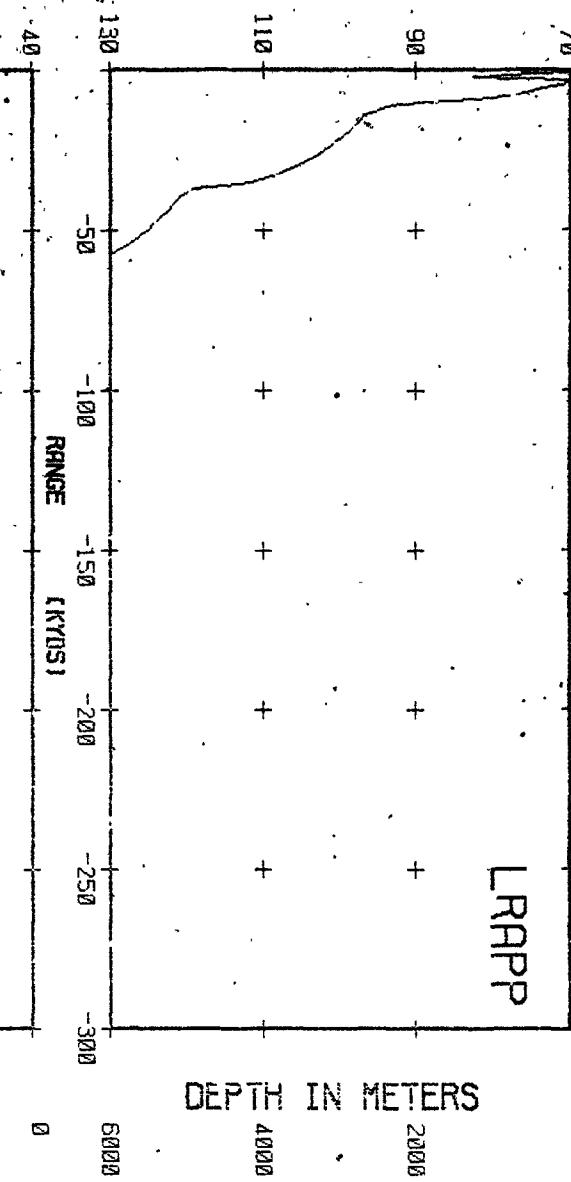
DB LOSS

AFTER 4B-SUMMER

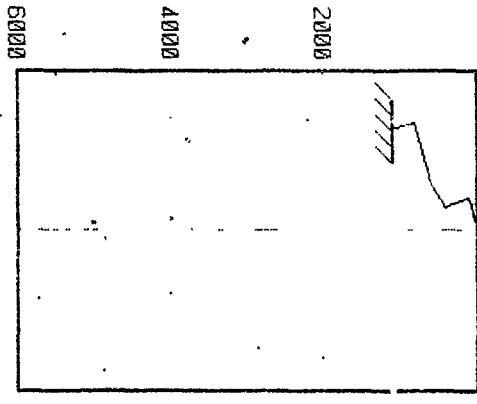
S 20 R 2525 F 300

1450 M/S 1500 1550

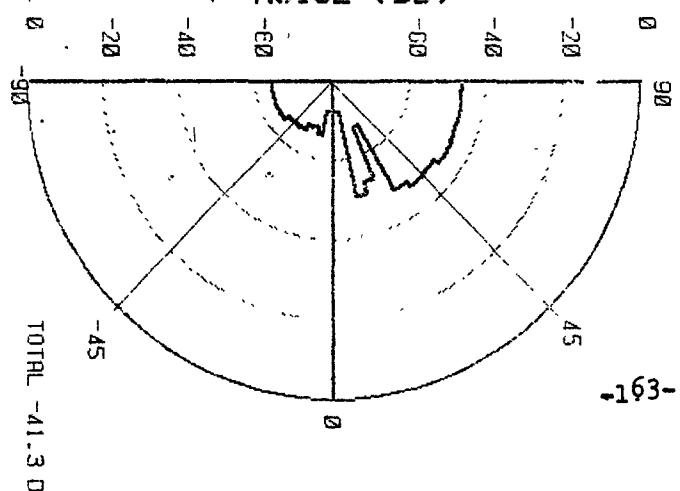
LRAPP



DEPTH IN METERS



NOISE (DB)



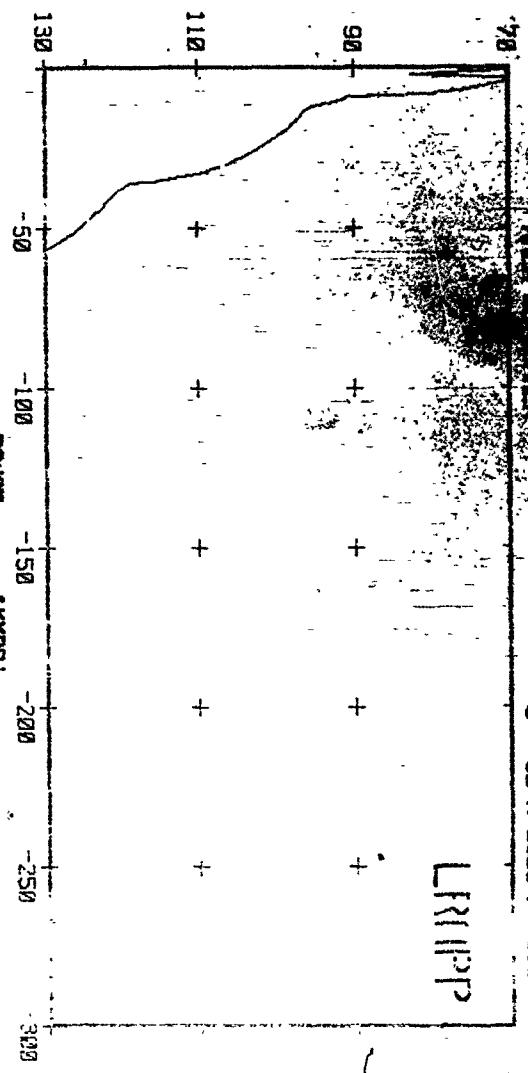
-163-

TOTAL -41.3 DB

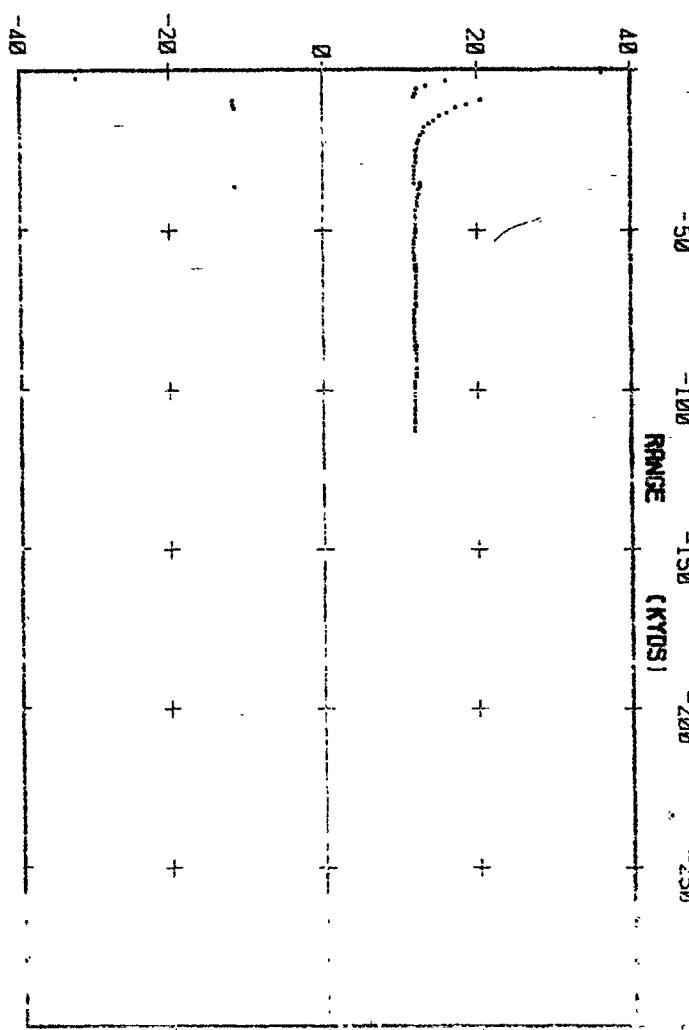
S 50 R 2625 F 5°

1450 M/S 1500 F/S 1550

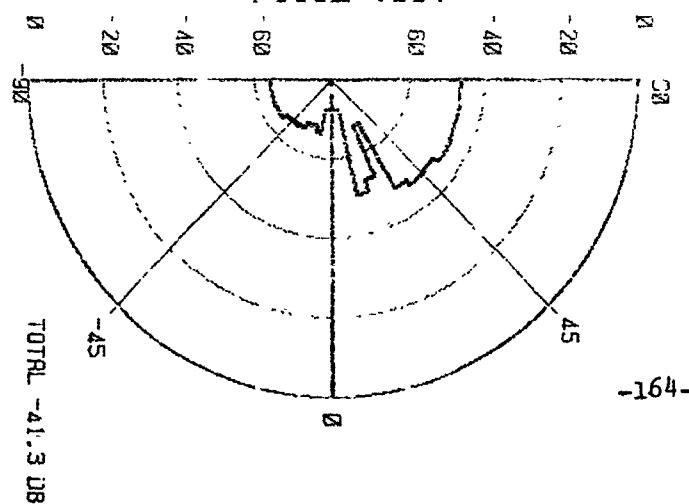
### DB LOSS



### ARRIVAL ANGLE



### NOISE (DB)



1450 M/S 1500 F/S 1550

70

RIVER AB SUMMER

S 266 R 2625 T 408

1452 M/

LRIAP

## DB LOSS

110

+

+

+

+

+

+

+

130

-

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40

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## ARRIVAL ANGLE

-

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-

## DEPTH IN METERS

2000

4000

6000

8000

10000

12000

14000

## NOISE (DB)

0

20

40

60

80

100

120

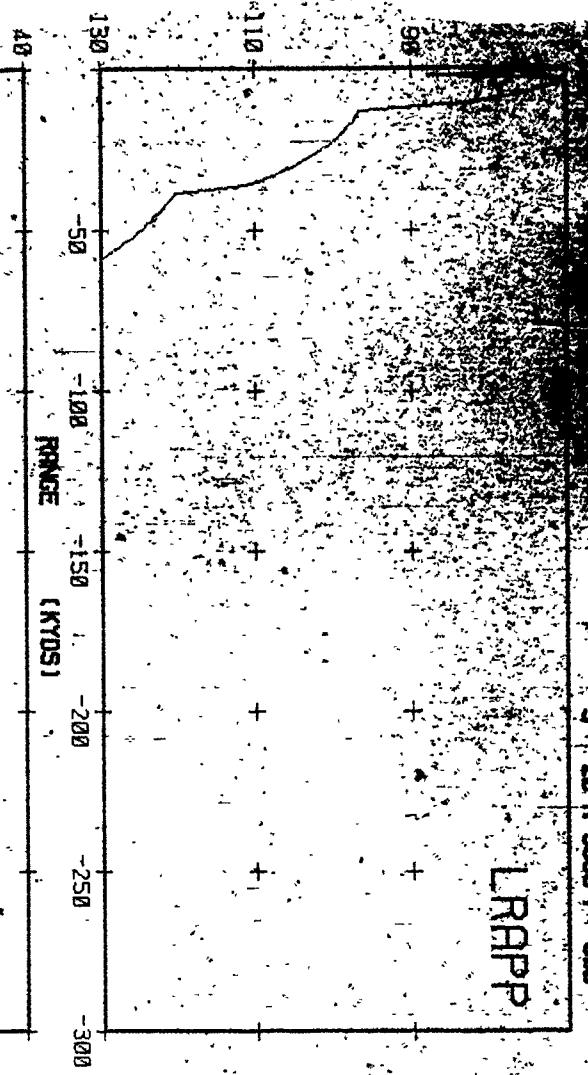
140

-165-

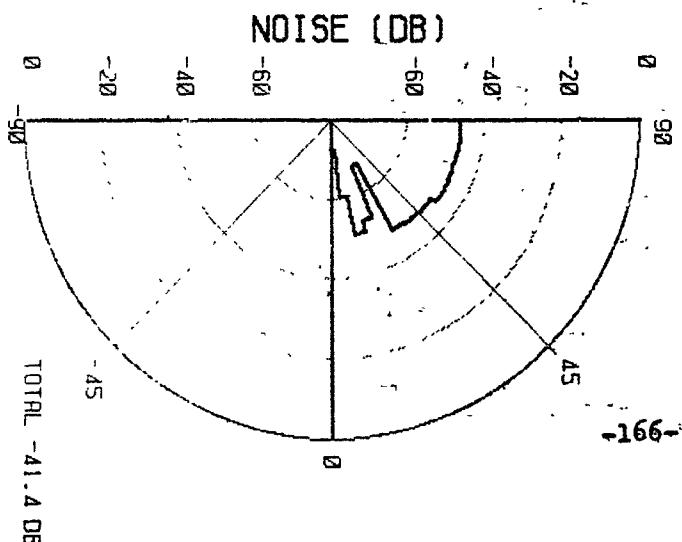
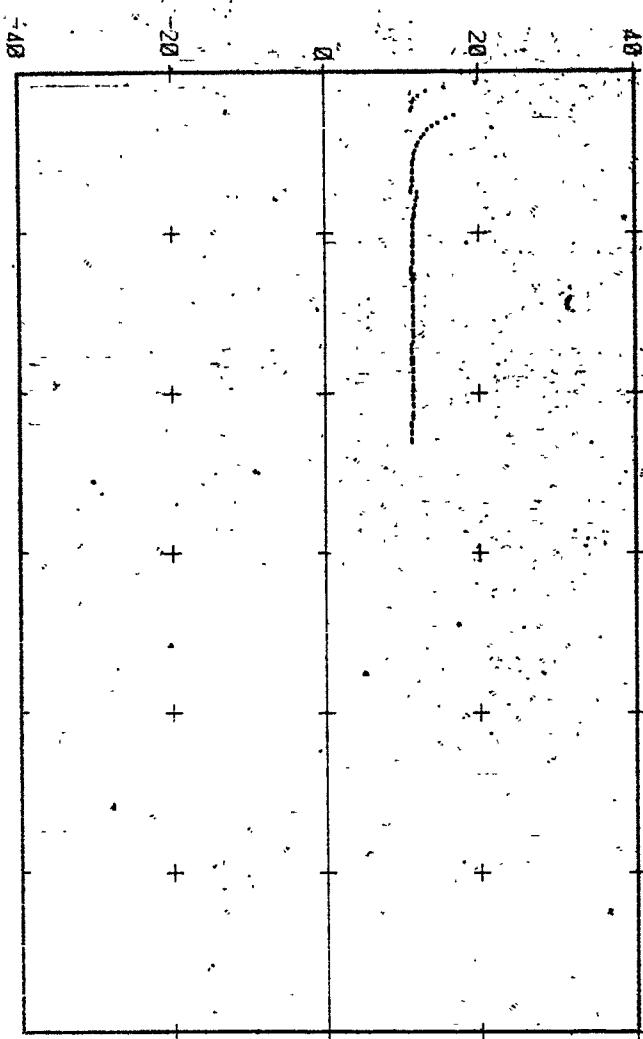
S 28 R 35S E 900 1450 MS 1500 1550

L RAPP

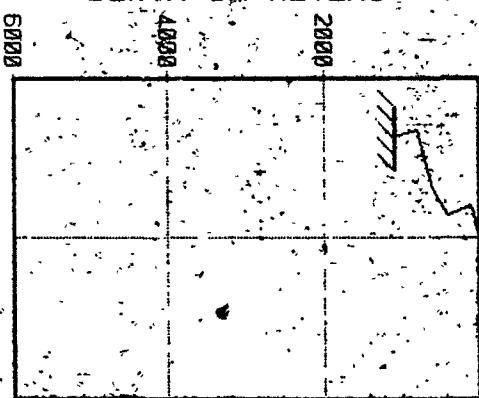
DB LOSS



ARRIVAL ANGLE



DEPTH IN METERS



TOTAL -41.4 DB

-40

ENTER AB SUMMER

S 50 R 3843

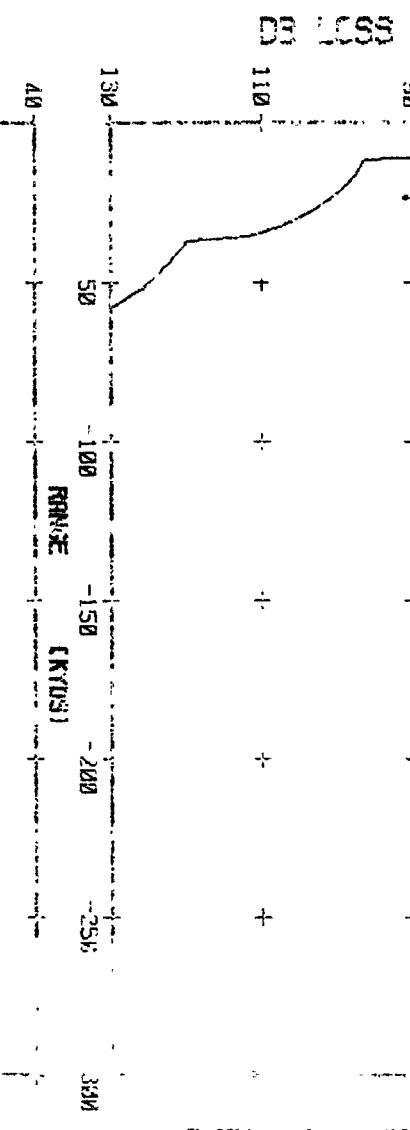
1450 KPS 1500 1550

L137P2

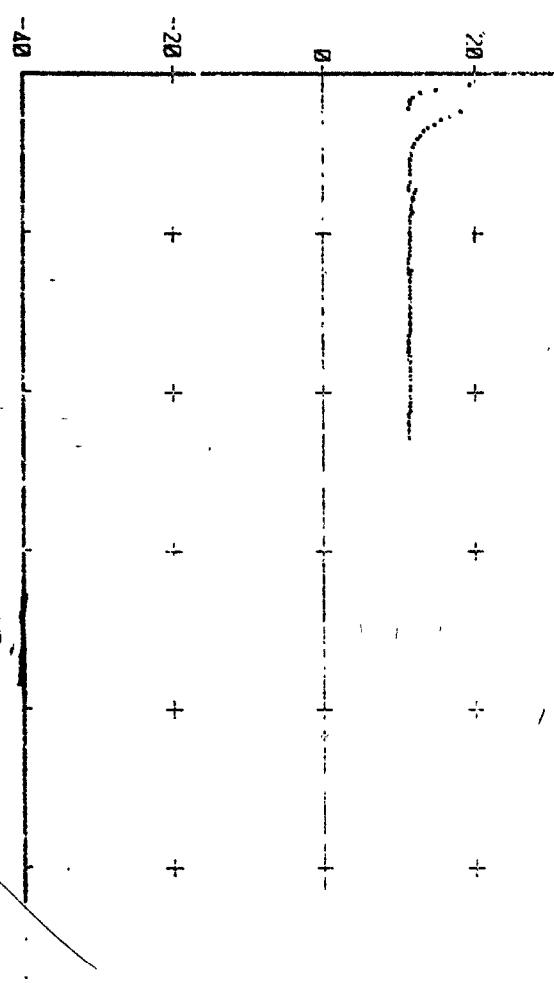
63  
11  
200E

11  
442E

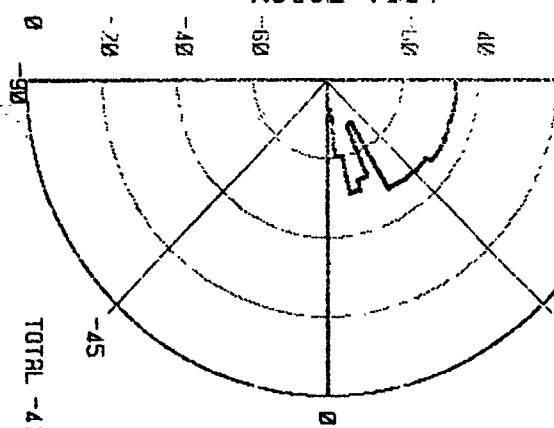
11  
11



ARRIVAL ANGLE



NOISE COMP



0 30 40 45 50 60 70

-167-

TOTAL -41.4 DB

RECD AT BAKER

S 288 R 5555 F 963

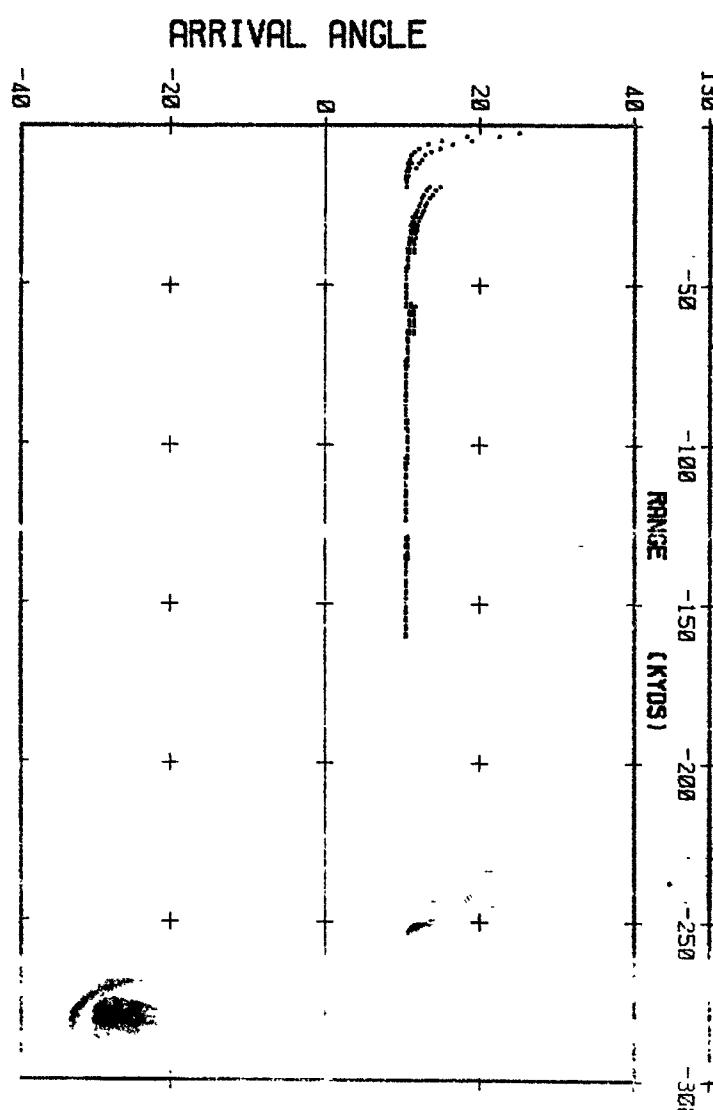
1450 Hz

1500

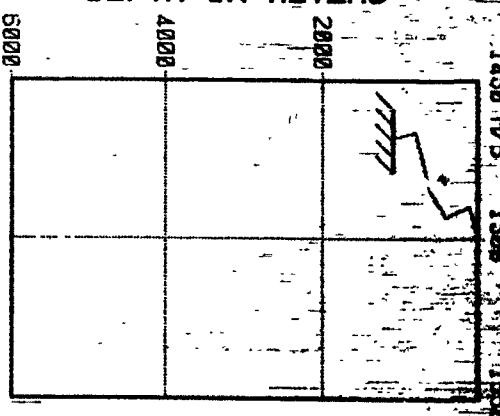
1550

LRHAPP

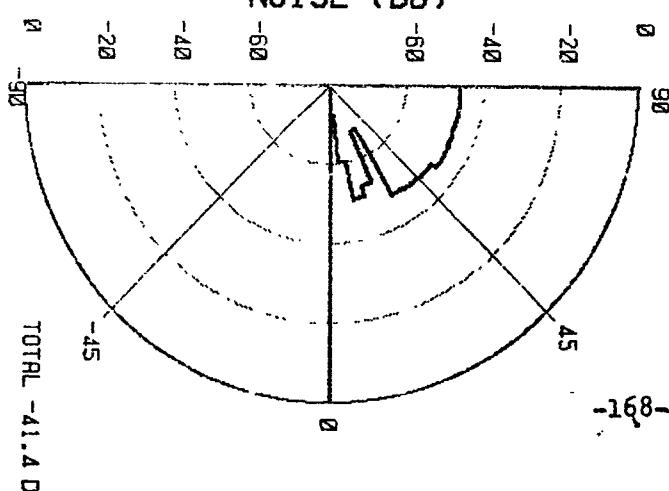
DB LOSS



DEPTH IN METERS



NOISE (DB)

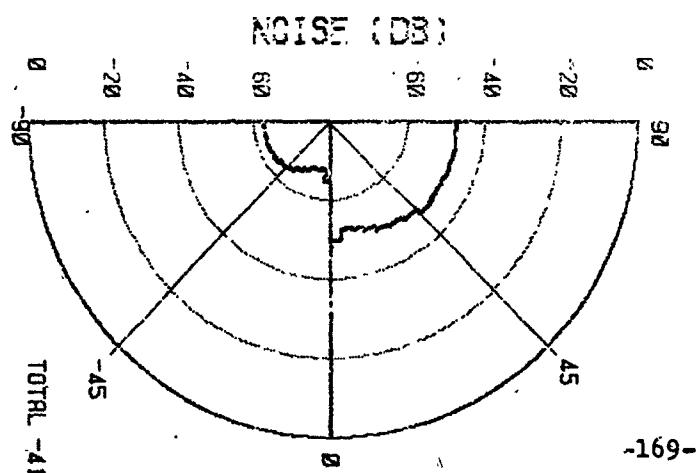
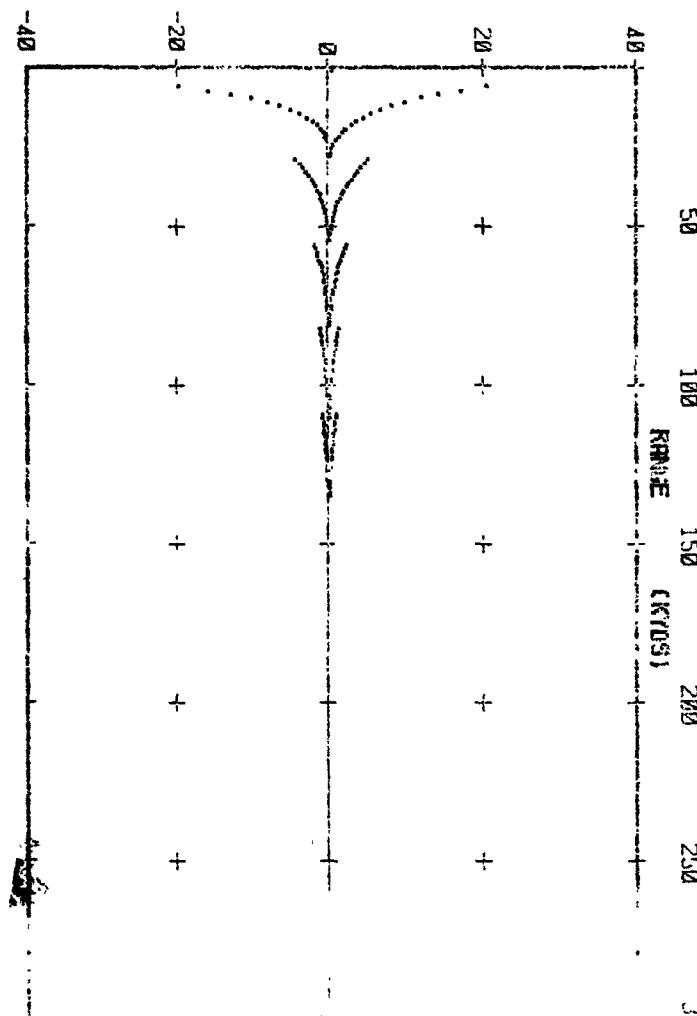
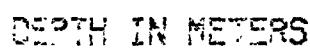
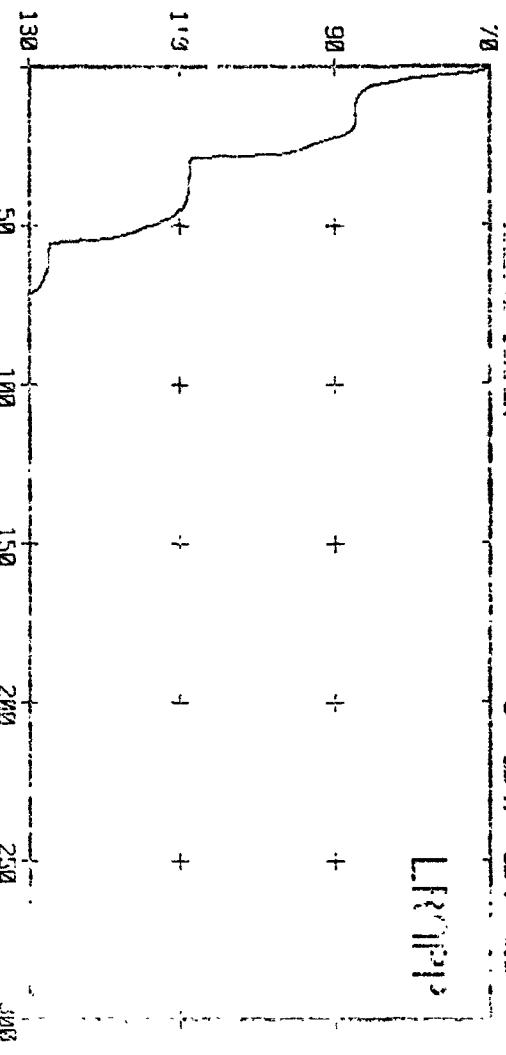
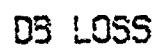


1

NETHERLANDS

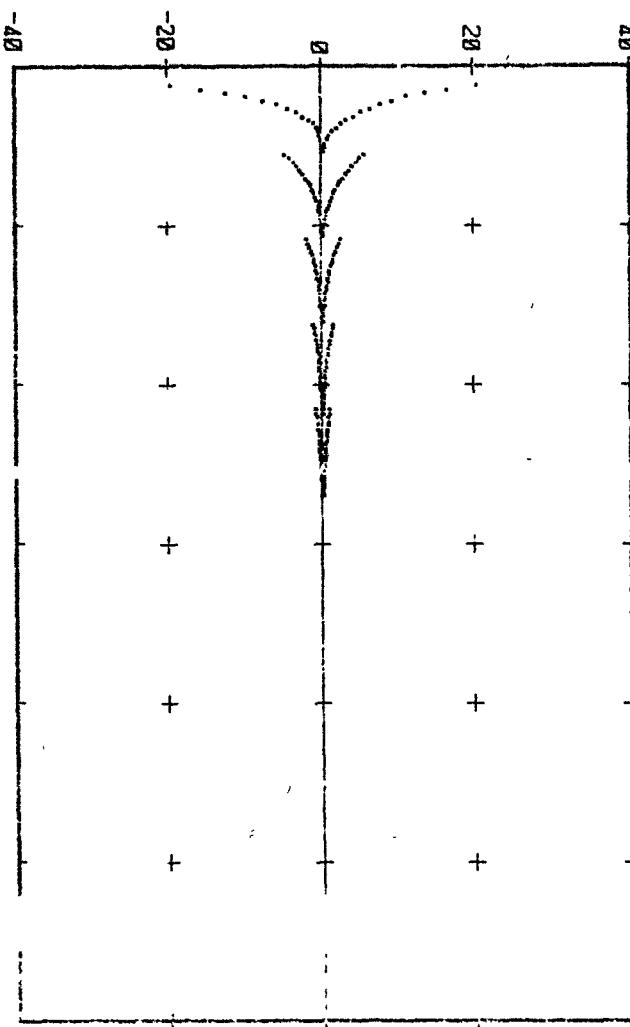
10

1331

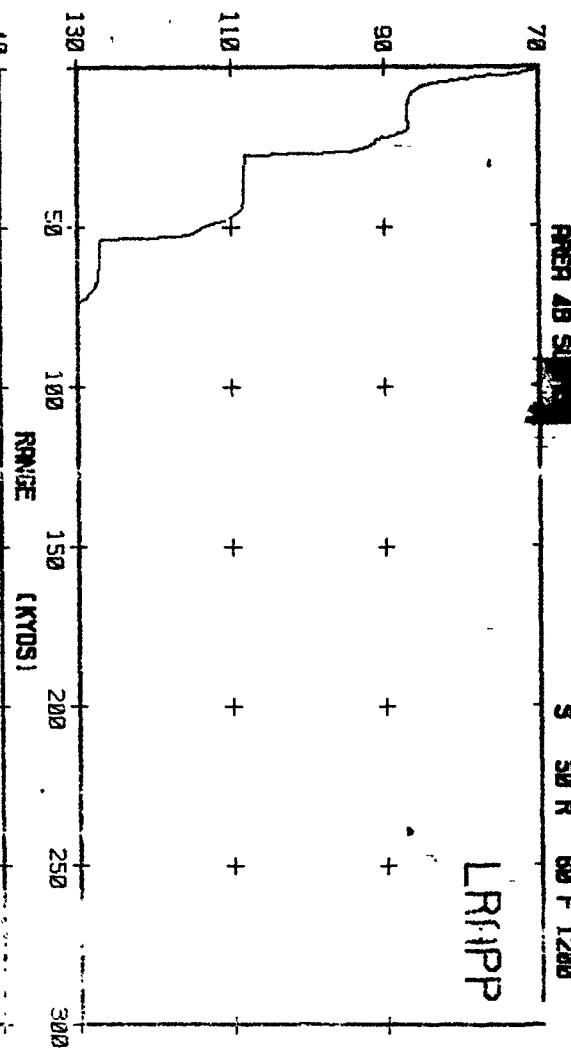


-169-

### ARRIVAL ANGLE



### DB LOSS



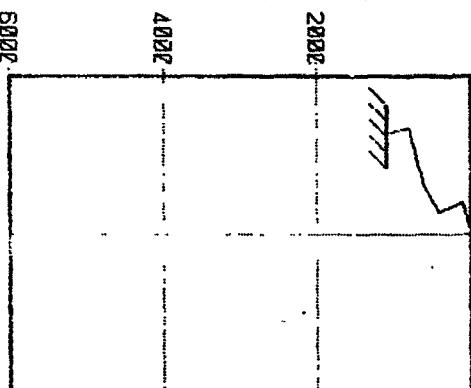
LRIPP

PINGER 4B SIGHT

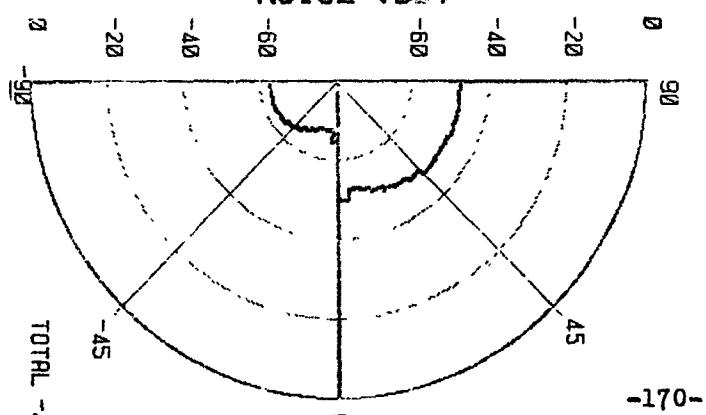
S 50 R 60 F 1200

1450 M/S 1500 1550

### DEPTH IN METERS



### NOISE (DB)



TOTAL -41.3 DB

-170-

RER AB SUMMER

S 266 R. 62 F 1200

1450 M/S 1500 1550

LRAPP

DB LOSS

90 + + + + +

110 + + + + +

130  
50 100 150 200 250 300  
RANGE (KMS)

DEPTH IN METERS

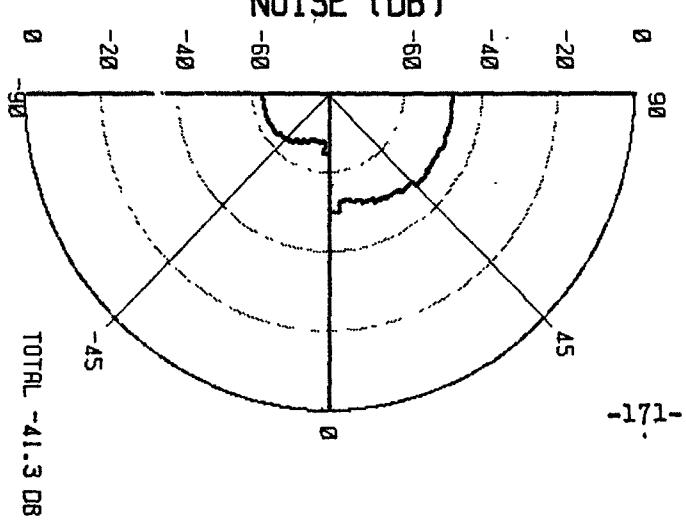
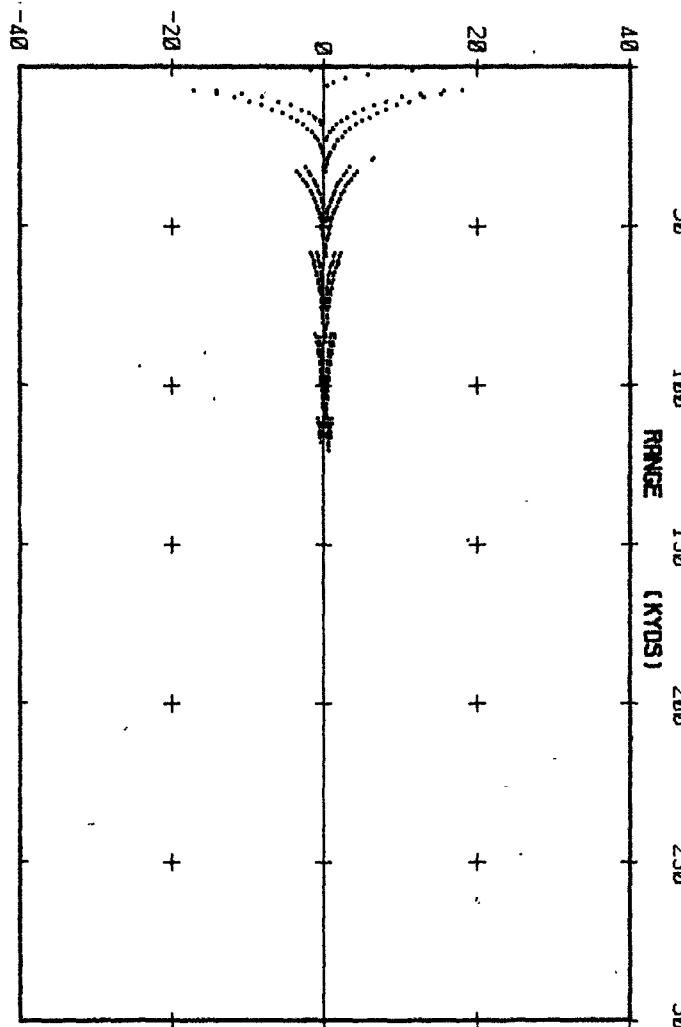
2000  
4000  
6000

ARRIVAL ANGLE

-20 + + + + +  
0 + + + + +  
20 + + + + +  
40 + + + + +

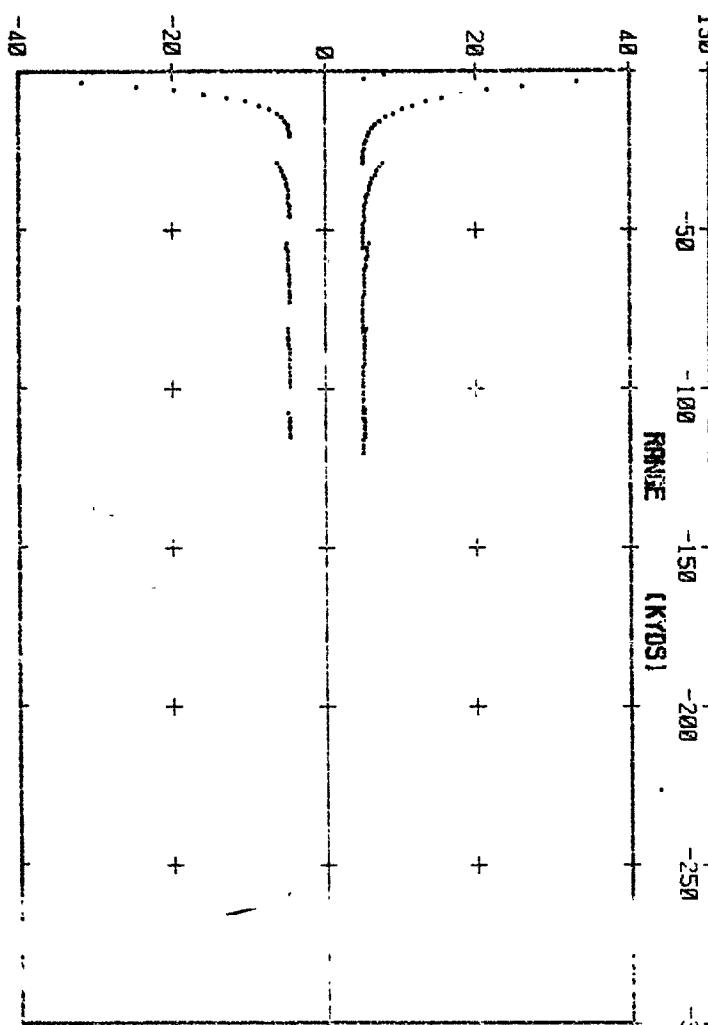
NOISE (DB)

0 -20 -40 -60 -80  
90 45 -171

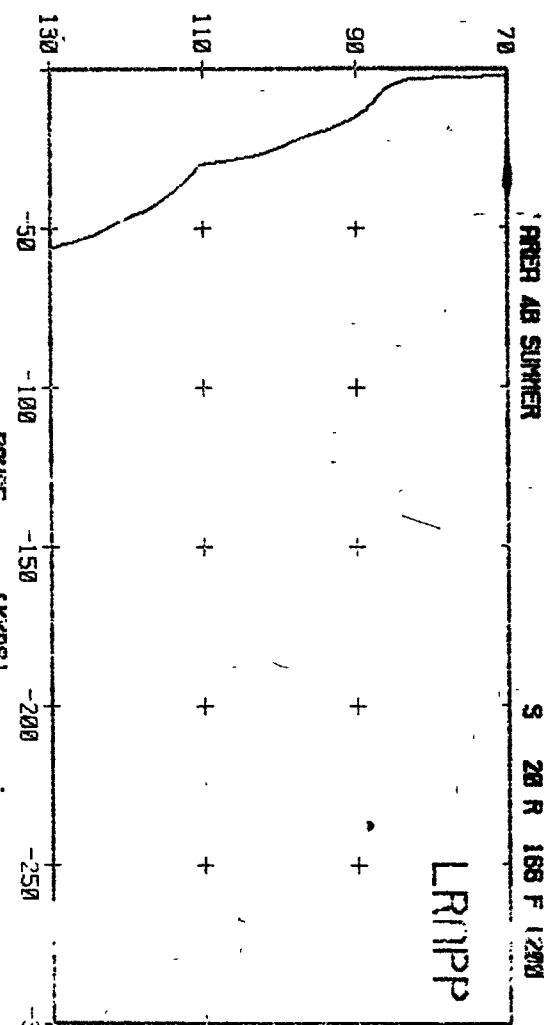


TOTAL -41.3 DB

ARRIVAL ANGLE

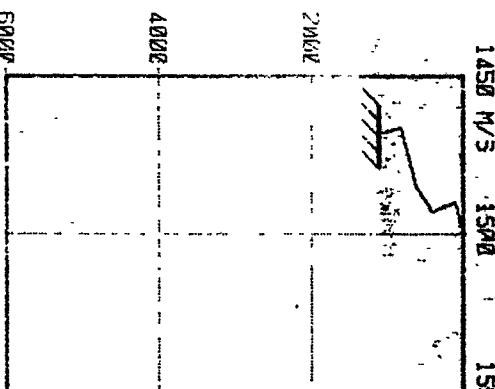


DB LOSS

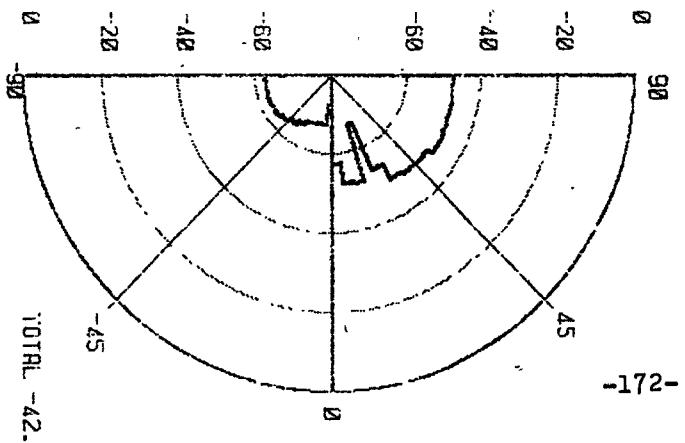


LR/RPP

DEPTH IN METERS



NOISE (DB)



72

AREA 4B SUMMER

S 50 R 168 F 1234

14L

LR. 3012

2622

77

## DB LOSS

110 + + + + +

100 + + + + +

90 + + + + +

130 -50 -100 -150 -200 -250 -300

NOISE (KHZ)

DEPTH IN METERS

4000

3000

2000

1000

0

## ARRIVAL ANGLE

20 + + + + +

0 + + + + +

-20 + + + + +

-40 + + + + +

-60 + + + + +

-80 + + + + +

-100 + + + + +

-120 + + + + +

-140 + + + + +

-160 + + + + +

-180 + + + + +

-200 + + + + +

-220 + + + + +

-240 + + + + +

-260 + + + + +

-280 + + + + +

-300 + + + + +

-320 + + + + +

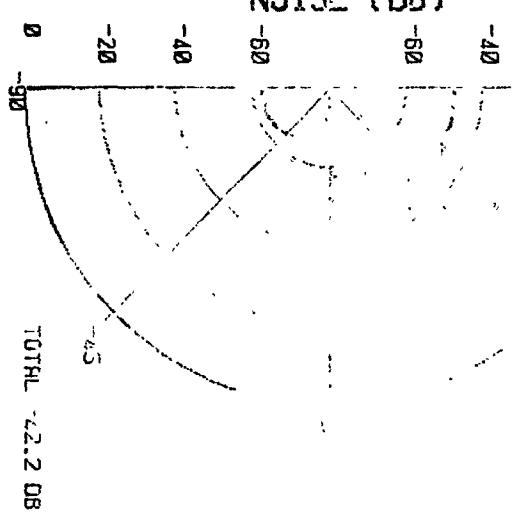
-340 + + + + +

-360 + + + + +

-380 + + + + +

-400 + + + + +

## NOISE (DB)

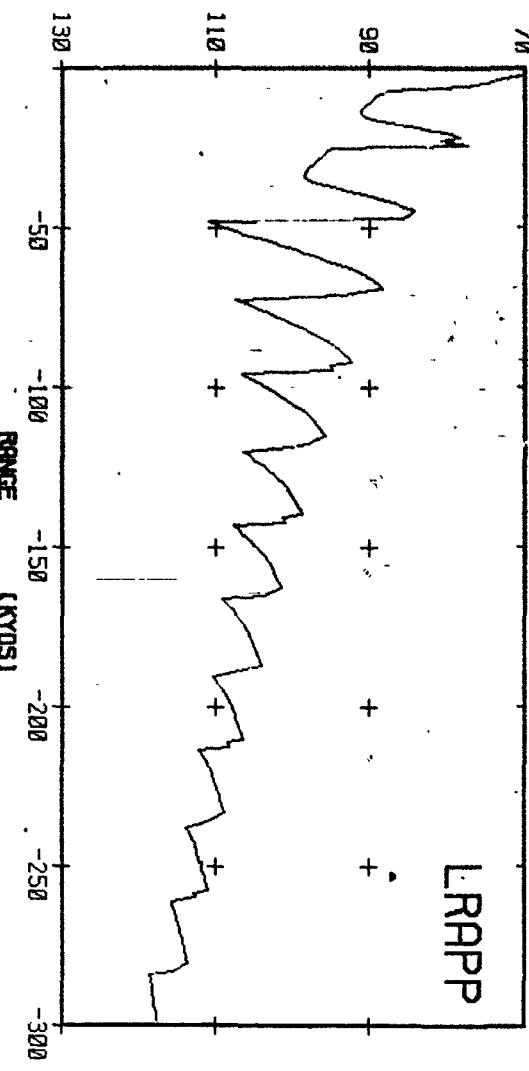


ARR 48 SUMMER

S 268 R 166 F 1200

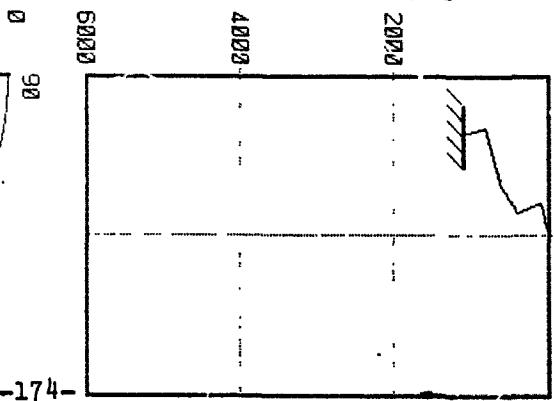
1450 M/S 1500 1550

### DB LOSS

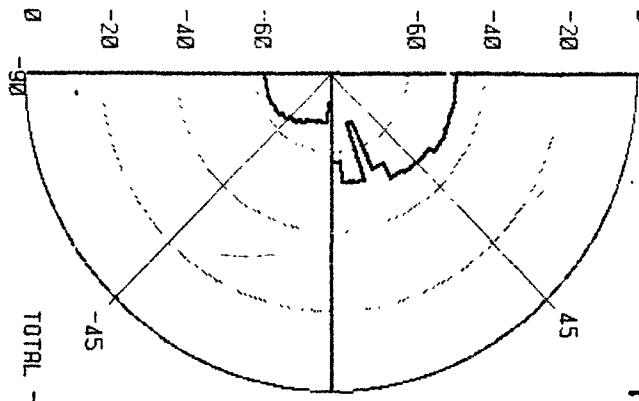


LRAAPP

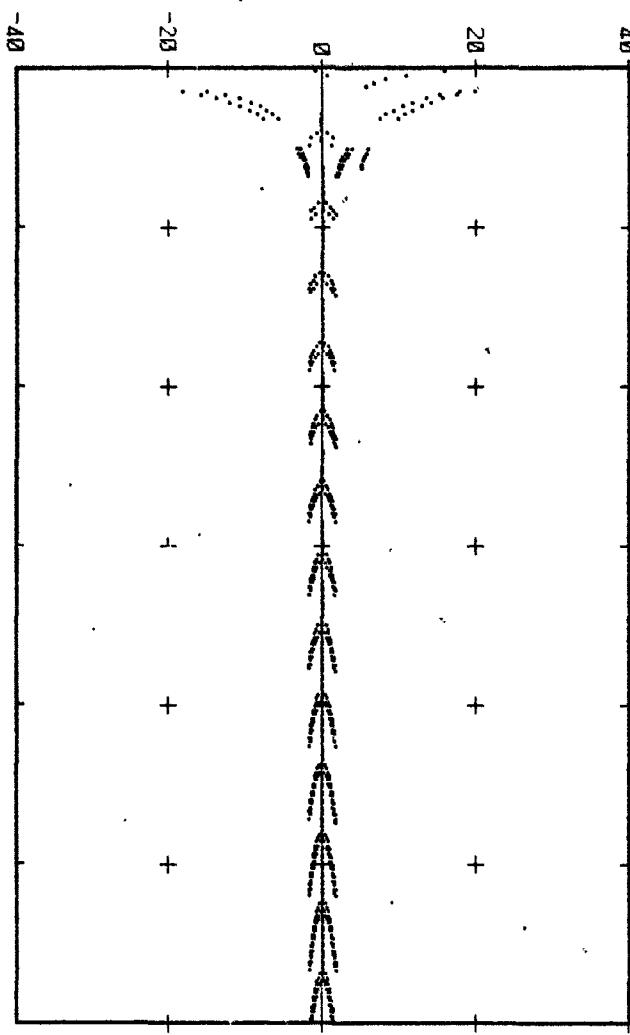
### DEPTH IN METERS



### NOISE (DB)



### ARRIVAL ANGLE



70

FARER AB SUMMER

S 28 R 300 F 1200

1450 M/S 1500 1550

LRIP

## DB LOSS

130  
110  
90  
70

RANGE (KYDS)

-50 -100 -150 -200 -250 -300

## DEPTH IN METERS

2000

4000

6000

8000

10000

12000

14000

16000

18000

20000

22000

24000

26000

28000

30000

32000

34000

36000

38000

40000

42000

44000

46000

48000

50000

52000

54000

56000

58000

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68000

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72000

74000

76000

78000

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84000

86000

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92000

94000

96000

98000

100000

102000

104000

106000

108000

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112000

114000

116000

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606000

608000

610000

612000

614000

616000

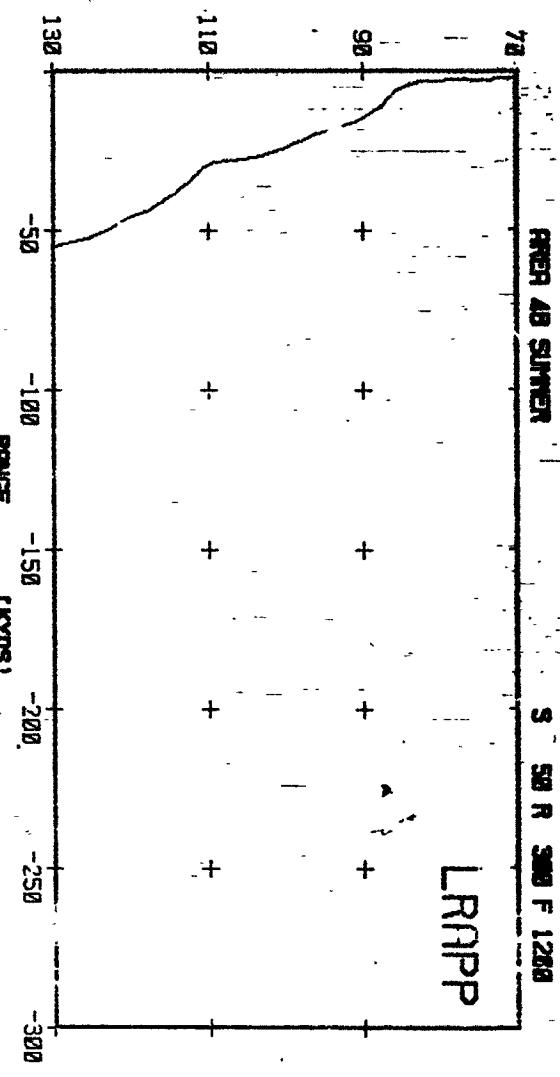
618000

620000

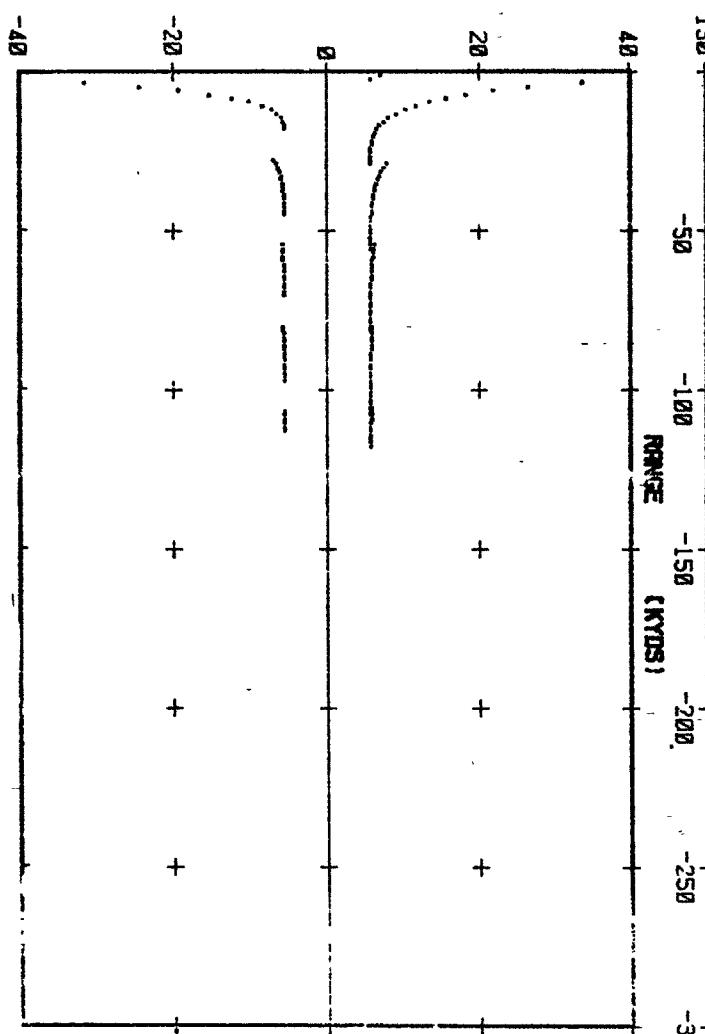
622000

624000

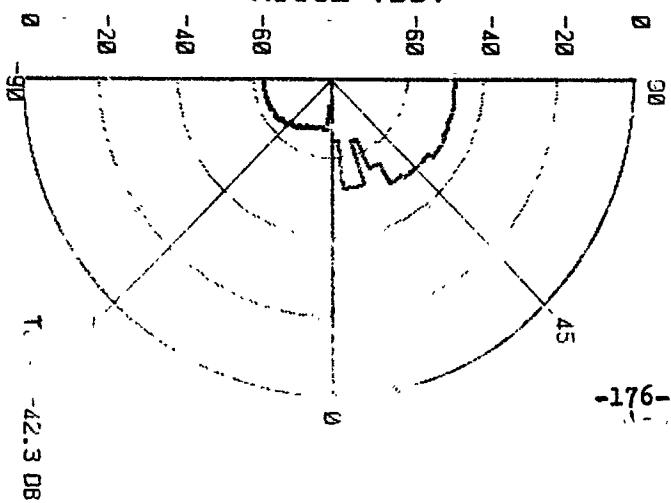
### DB LOSS



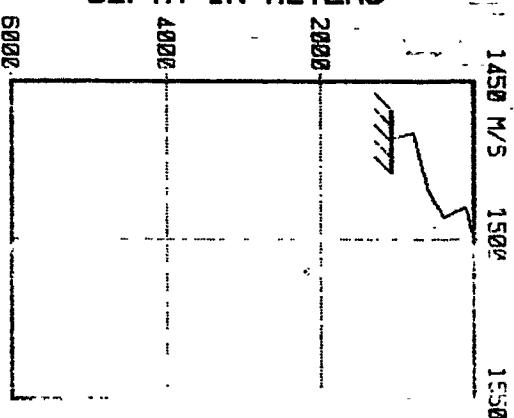
### ARRIVAL ANGLE



### NOISE (DB)



### DEPTH IN METERS

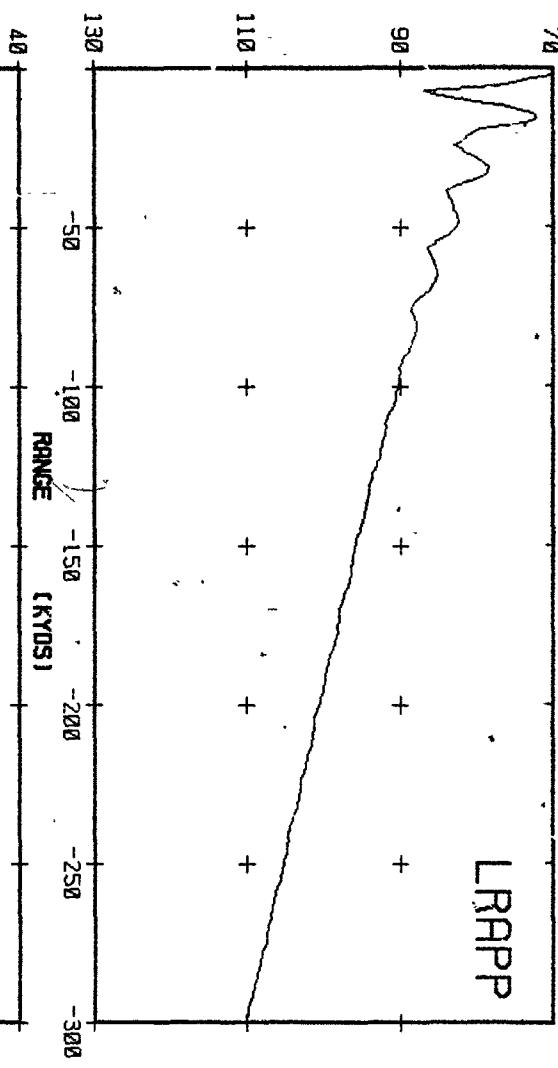


AREA AB SUMMER

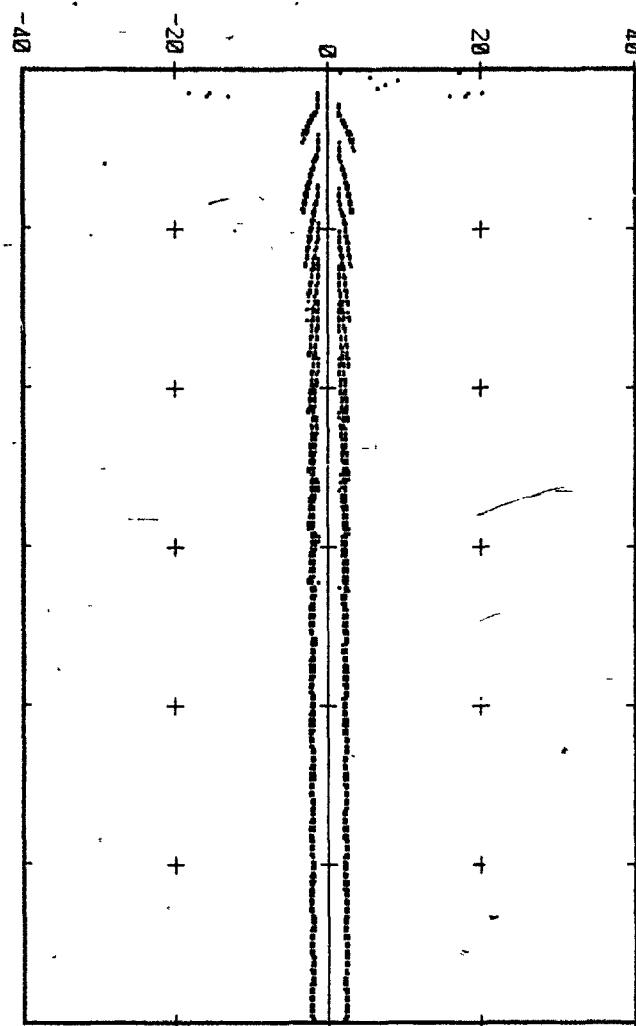
S 266 R 368 F 1200

1450 M/S 1520 1553

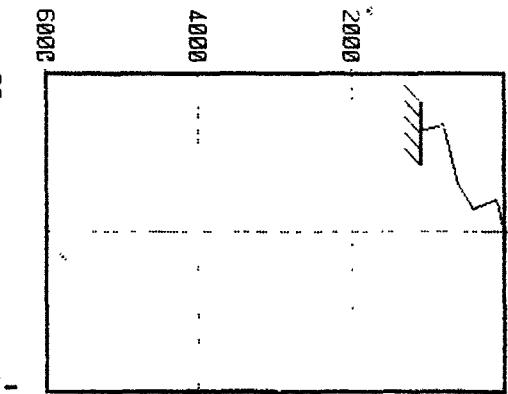
### DB LOSS



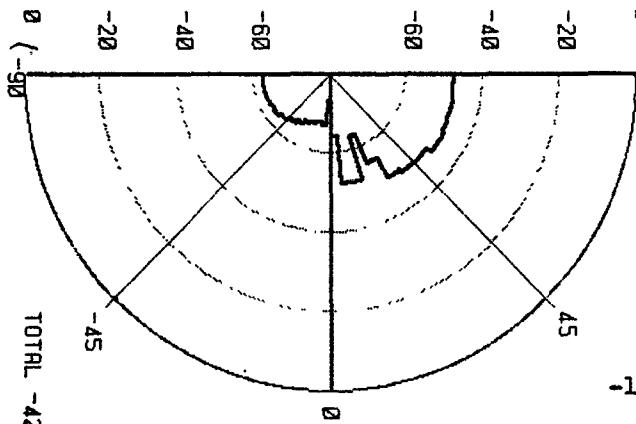
### ARRIVAL ANGLE



### DEPTH IN METERS



### NOISE (DB)



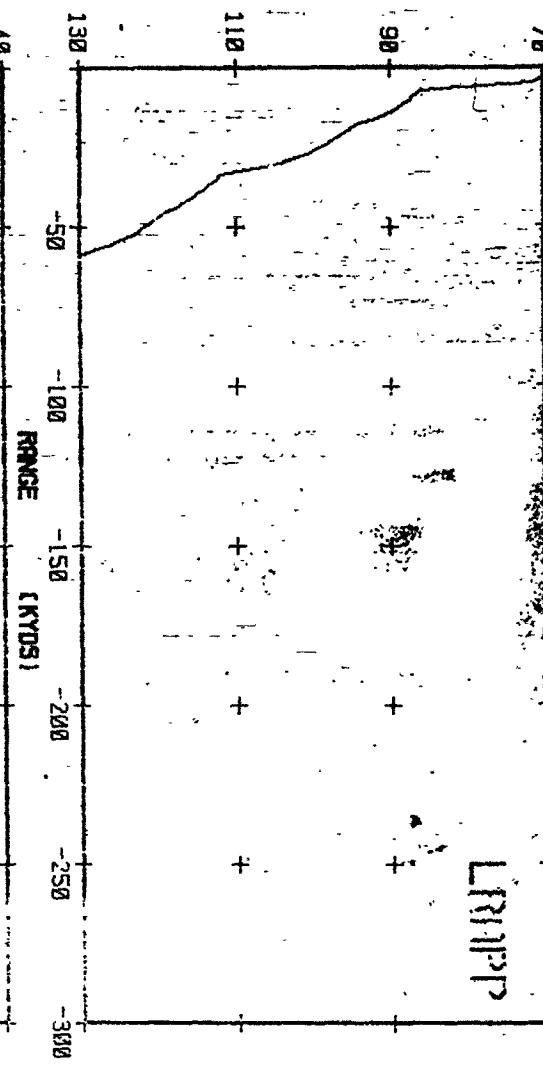
-177-

TOTAL -42.3 DB

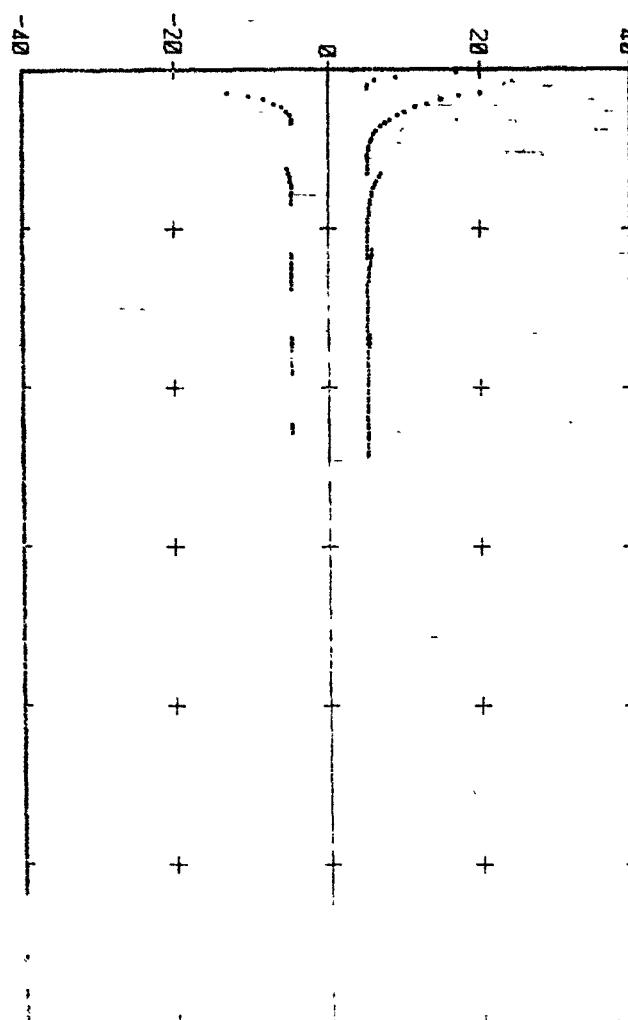
EVER AD SUMMER 5 20 R 10000 T 1204

1459 M/S 3500 1550

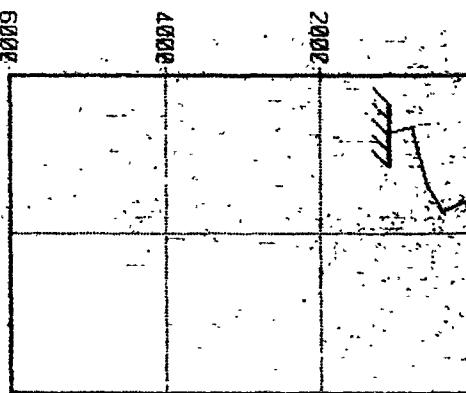
### DB LOSS



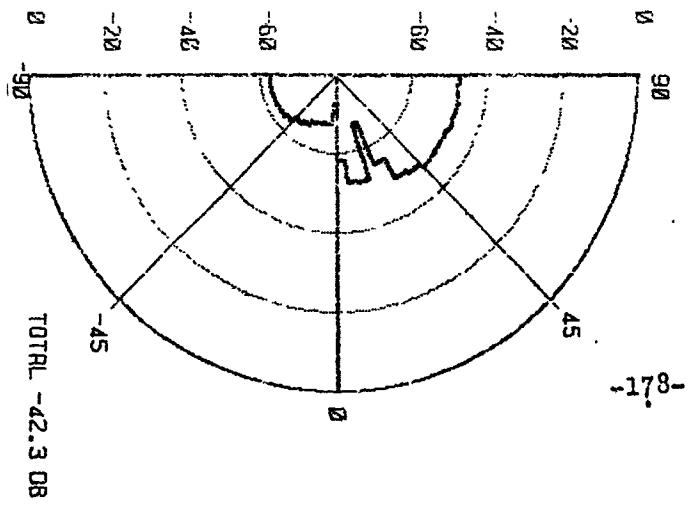
### ARRIVAL ANGLE



### DEPTH IN METERS



### NOISE (DB)



TOTAL -42.3 DB

70

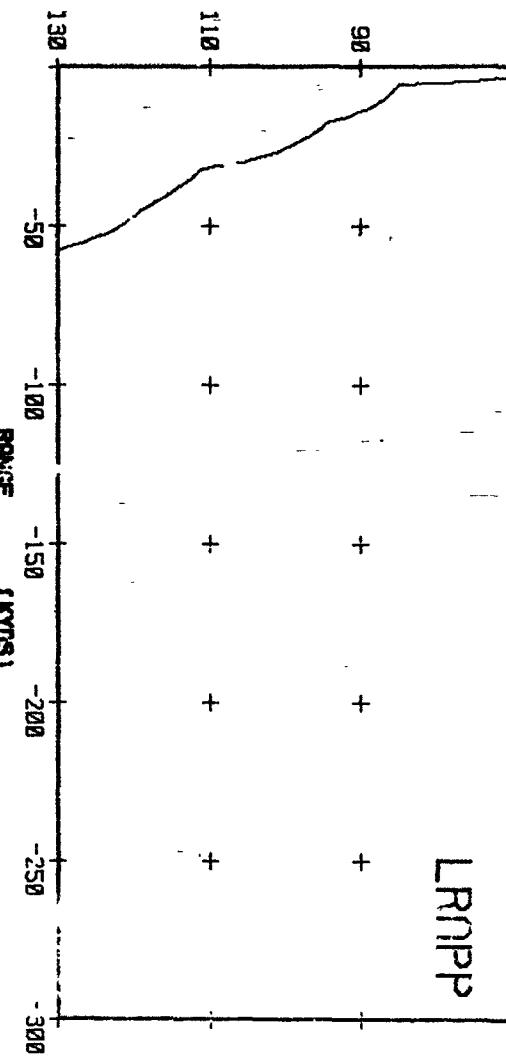
ARR 4B SUMMER

S 50 R 1000 F 1200

1450 M/S

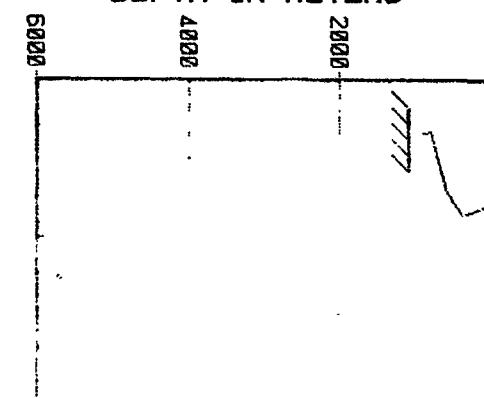
15.0

### DB LOSS

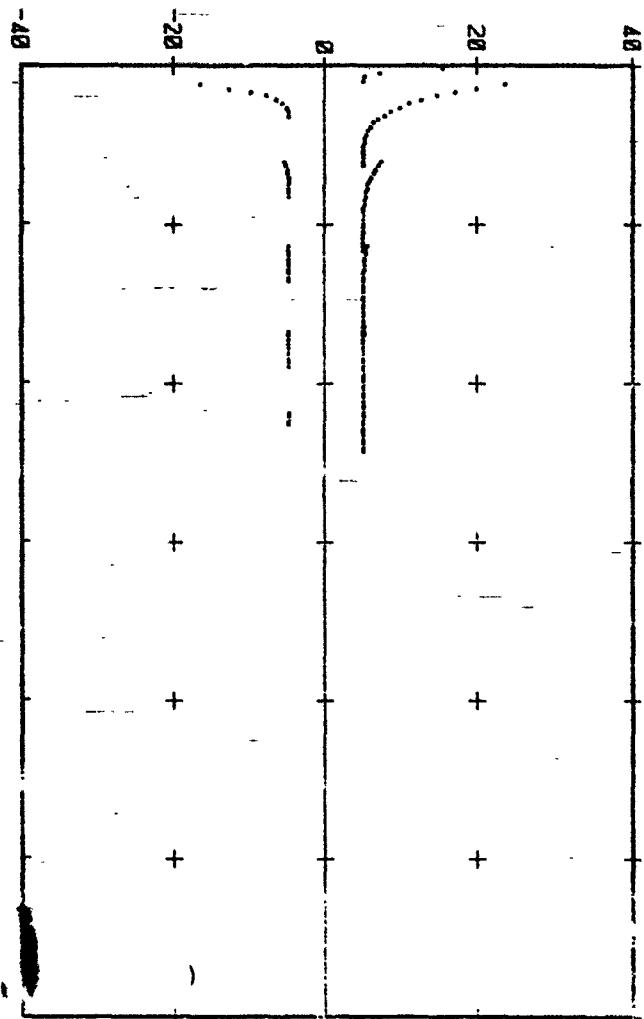


LRNPP

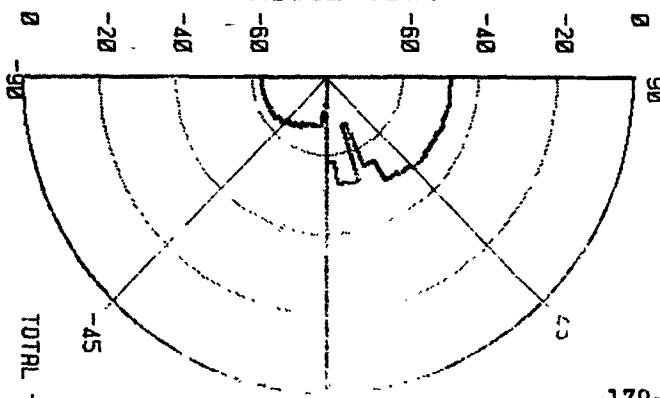
### DEPTH IN METERS



### ARRIVAL ANGLE



### NOISE (DB)



-179-

TOTAL -42.3 DB

70

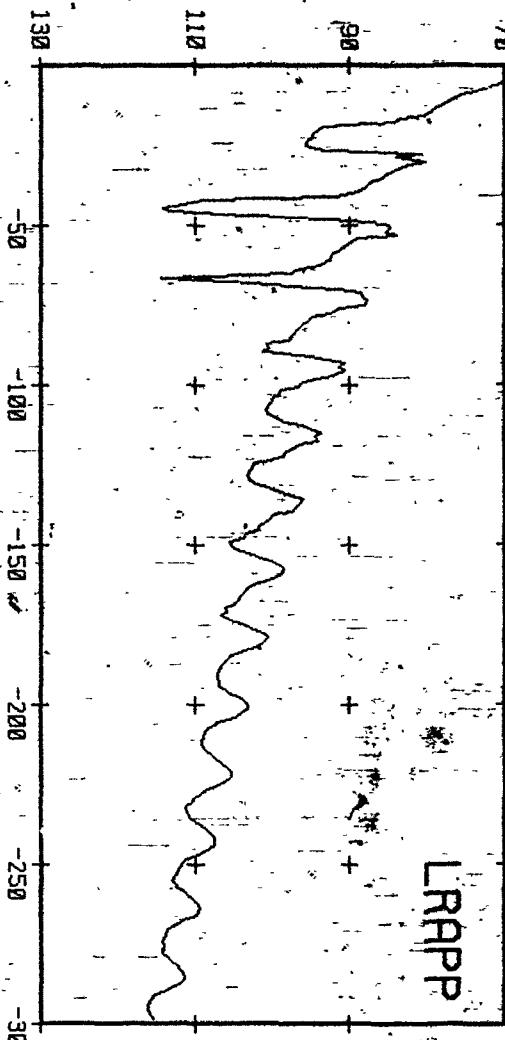
RER AB SUMMER

S: 288 R: 1088 F: 1200

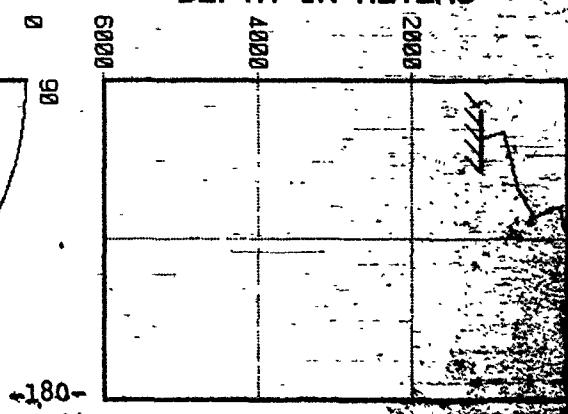
1450 M/S 1150

LRAPP

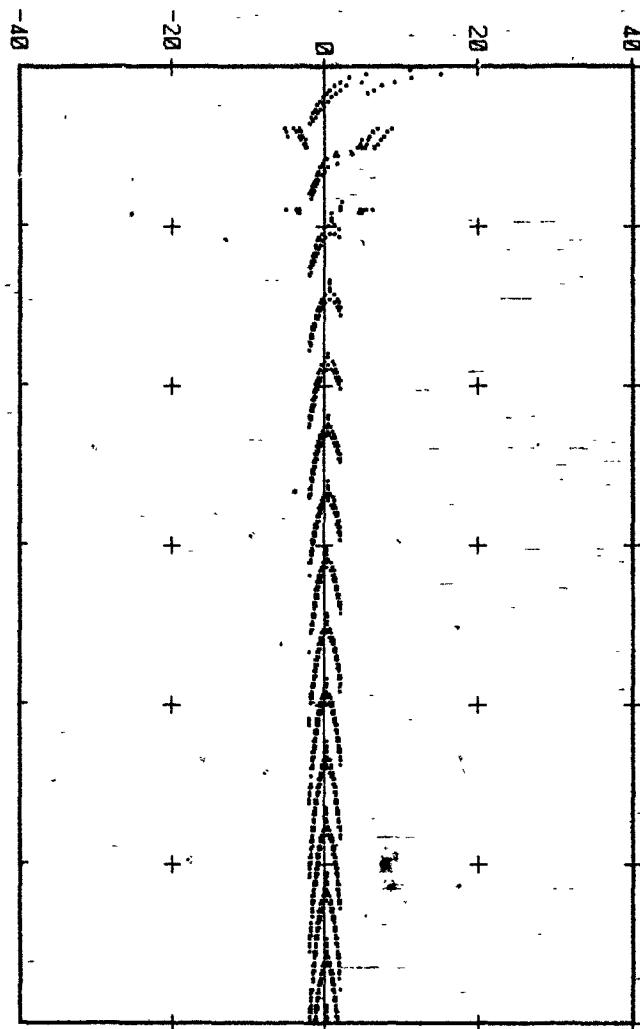
## DB LOSS



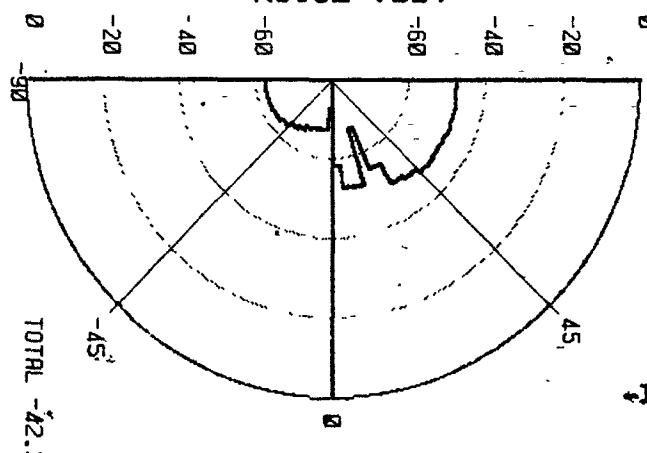
## DEPTH IN METERS



## ARRIVAL ANGLE



## NOISE (DB)



TOTAL -42.3 DB

70

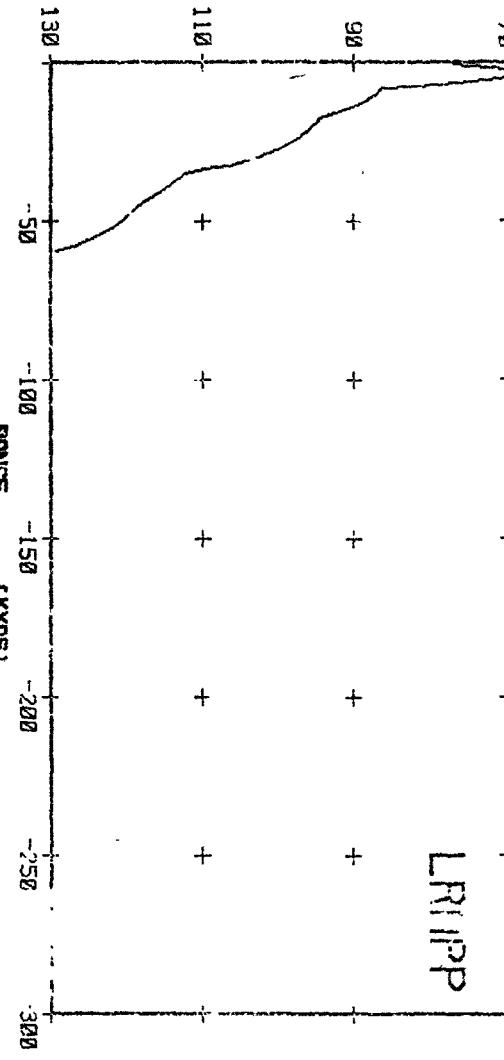
AFTER 4B SIMMER

S 20 R 1312 F 1243

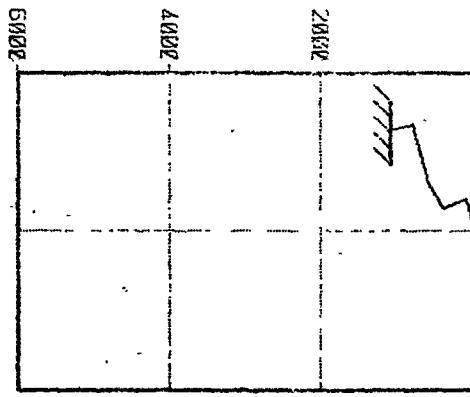
1450 M/S 1500 1550

LR/LPP

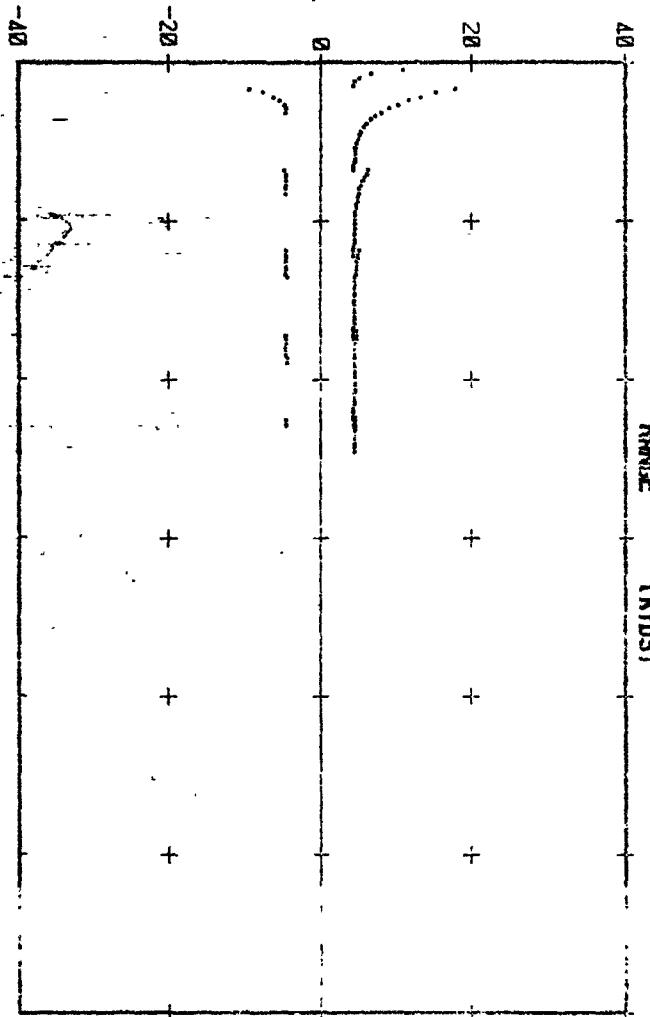
## DB LOSS



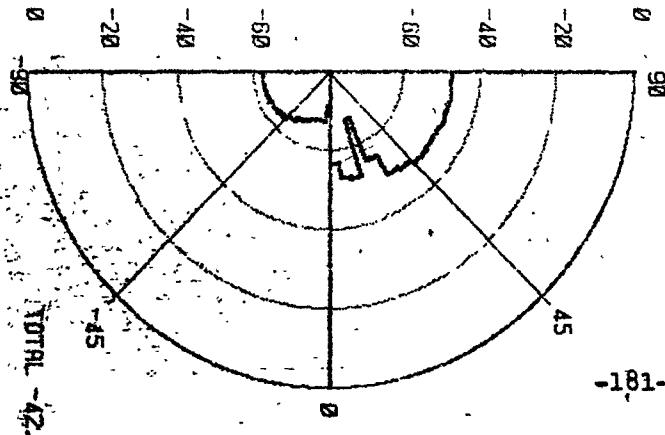
## DEPTH IN METERS



## ARRIVAL ANGLE



## NOISE (DB)



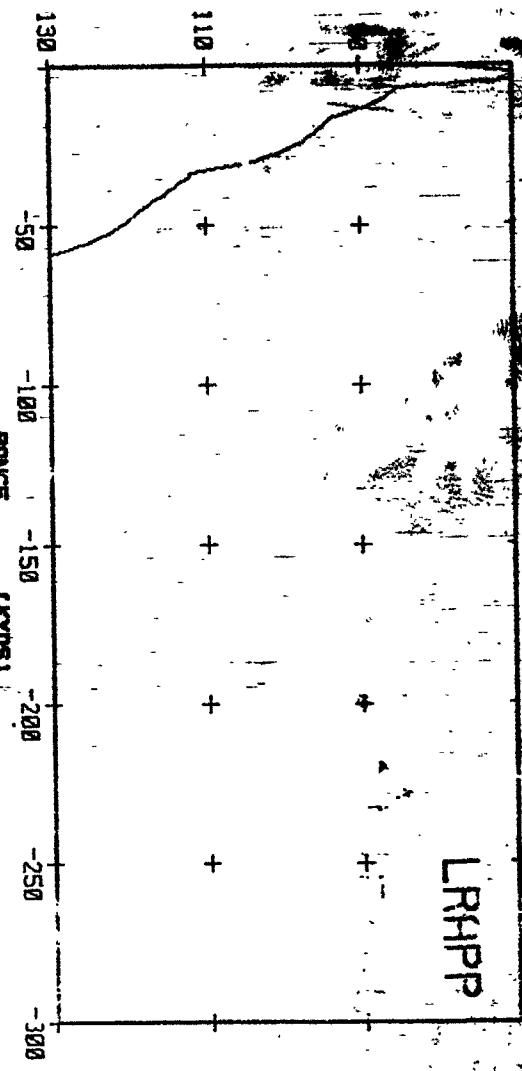
-181-

TOTAL -42.9 DB

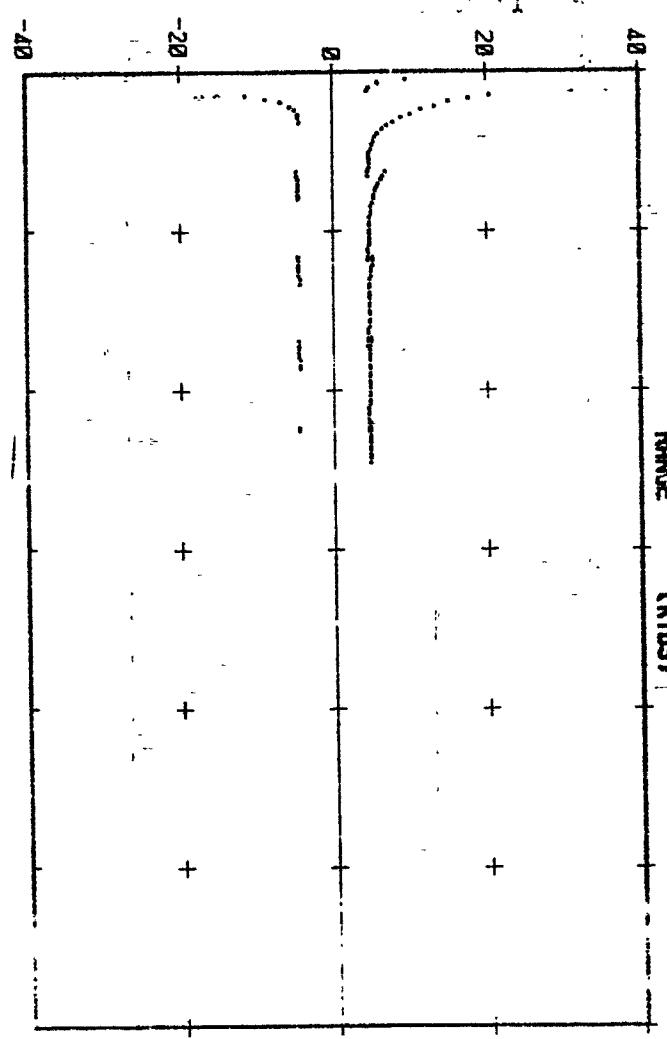
DATA ACQUISITION 1969 S SP R 1312 F 123

M/S 1500 1550

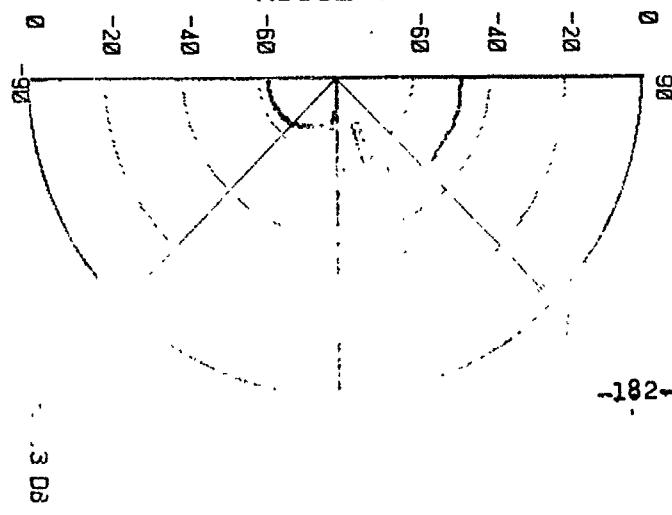
### DB LOSS



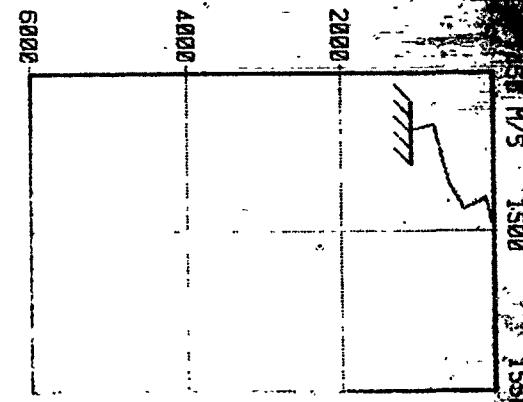
### ARRIVAL ANGLE



### NOISE (DB)



### DEPTH IN METERS



3 DB

70

AREA 4B SUMMER

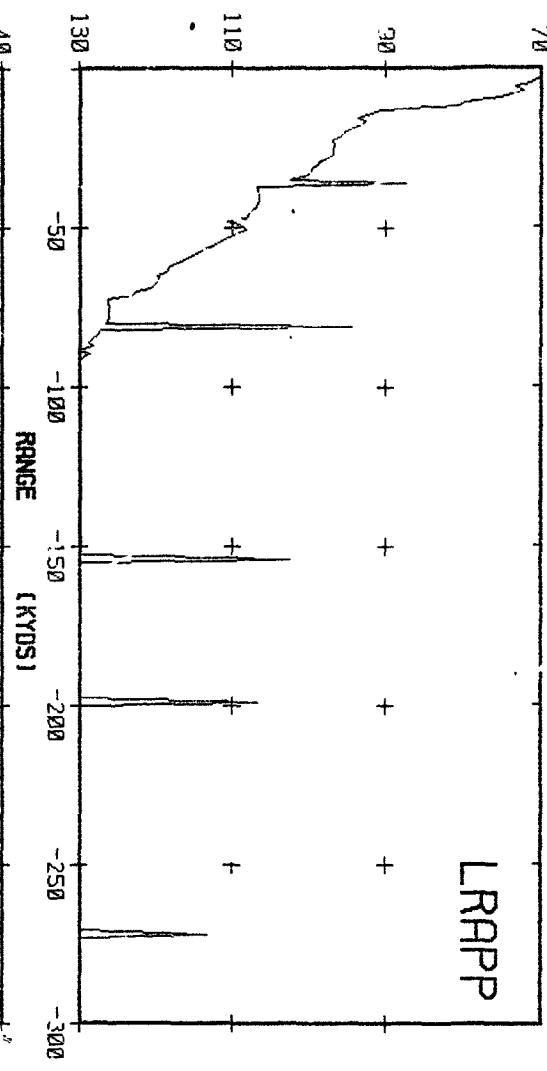
S 265 R 1312 F 1260

1450 M/S 1500

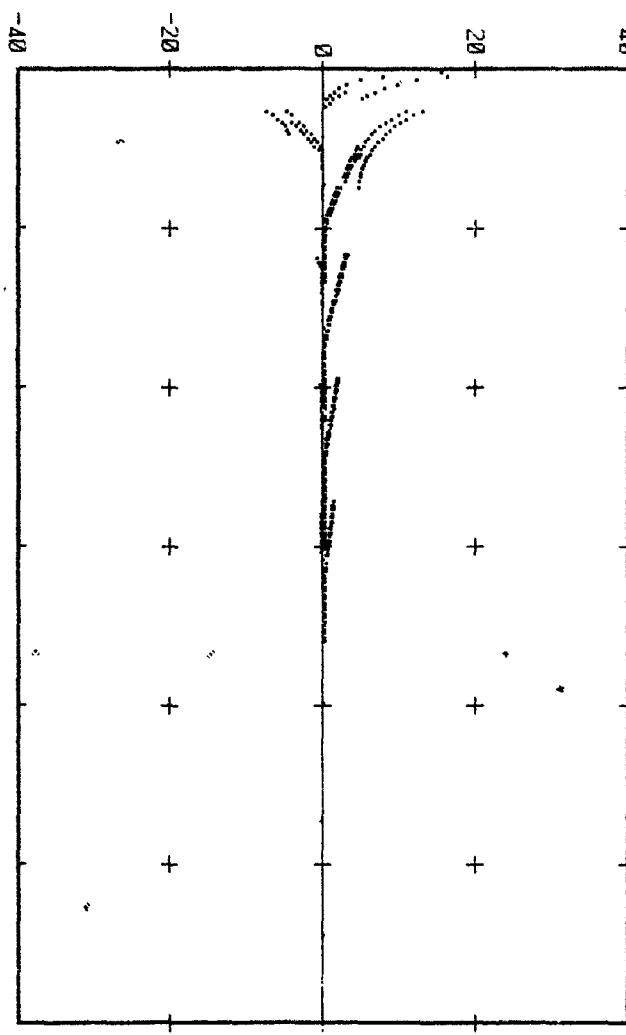
1550

LRAPP

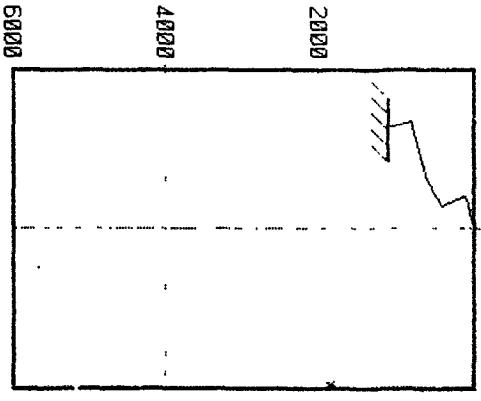
## DB LOSS



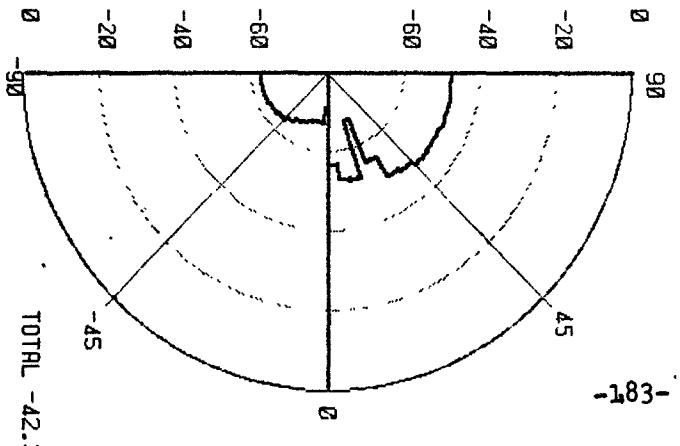
## ARRIVAL ANGLE



## DEPTH IN METERS



## NOISE (DB)



TOTAL -42.3 DB

70

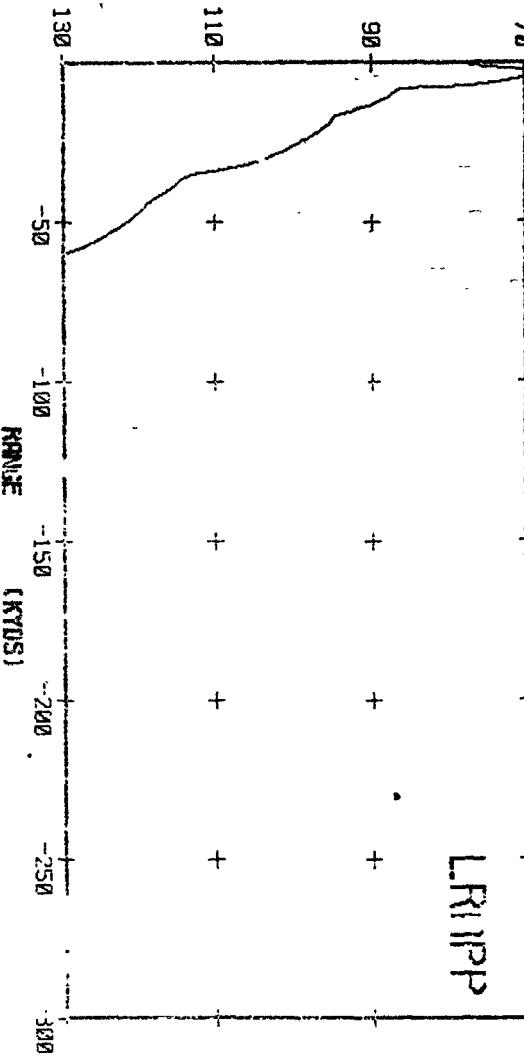
AREA 48 SUMMER

S 20 R 15M0 F 1200

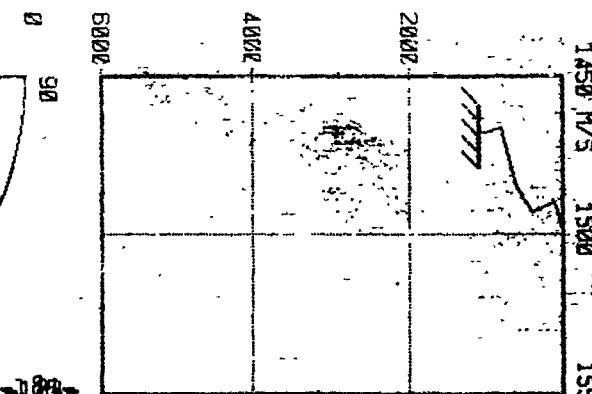
1450 M/S 1500 1550

LRWPP

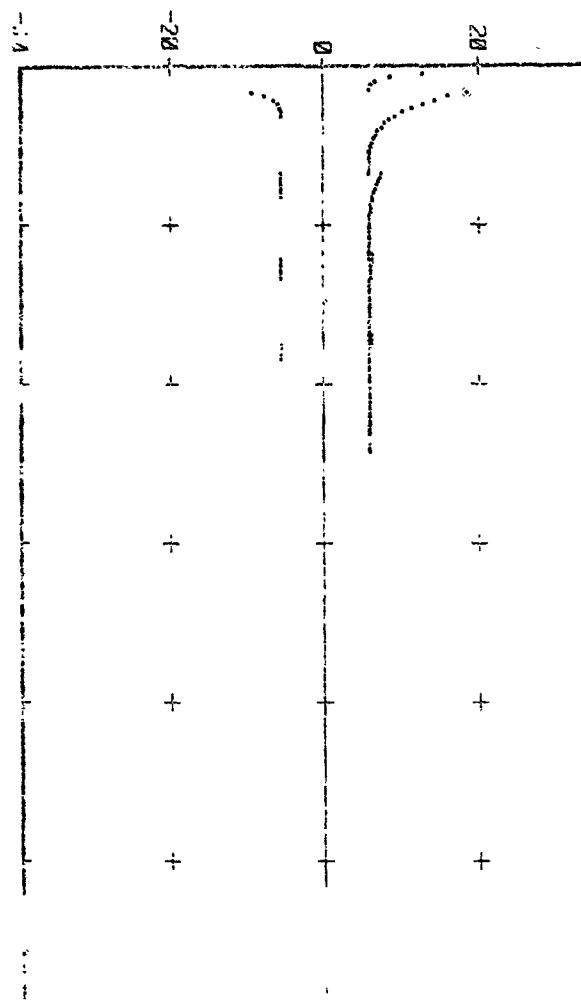
## DB LOSS



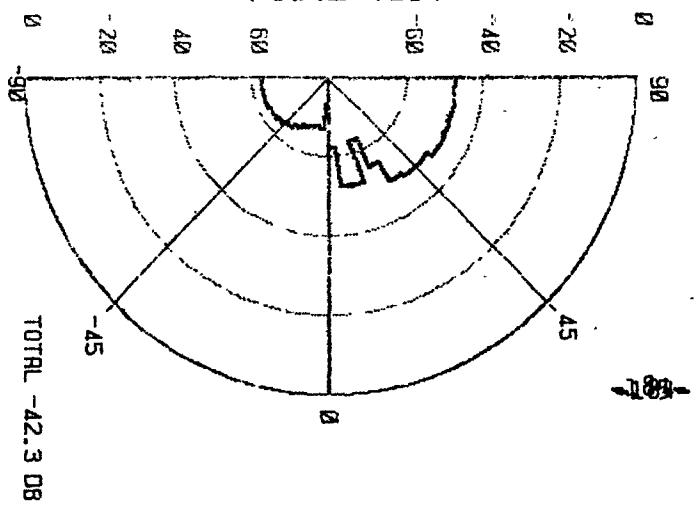
## DEPTH IN METERS



## ARRIVAL ANGLE



## NOISE (DB)



70

ARR 4B SUMMER

S 59 R 1500 F 1232

1450 M/S

LR(PP)

## DB LOSS

130  
110  
90  
70

6000

4000

2000

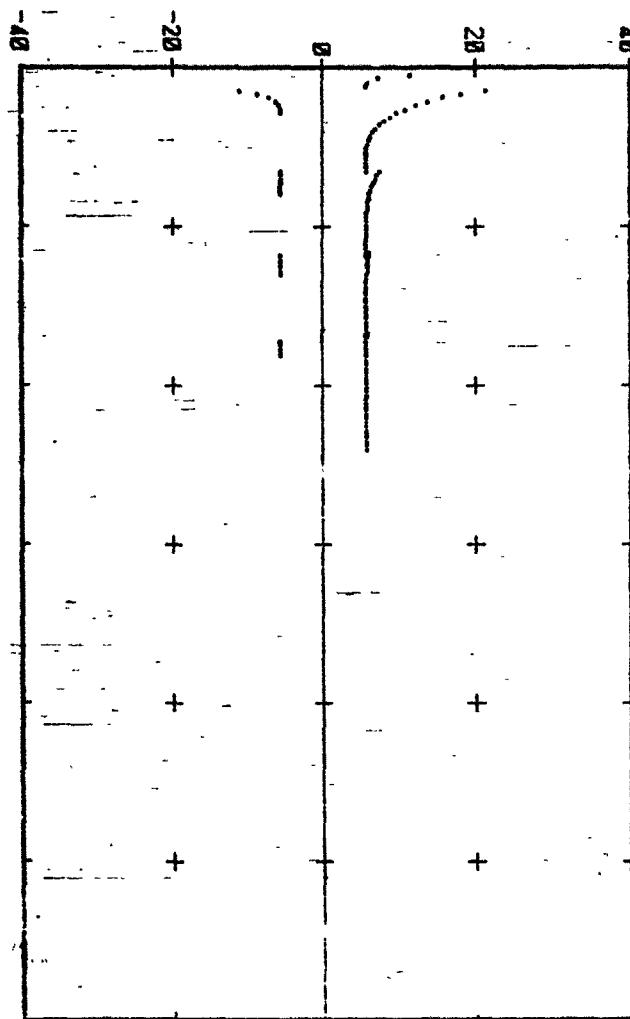
0

## DEPTH IN METERS

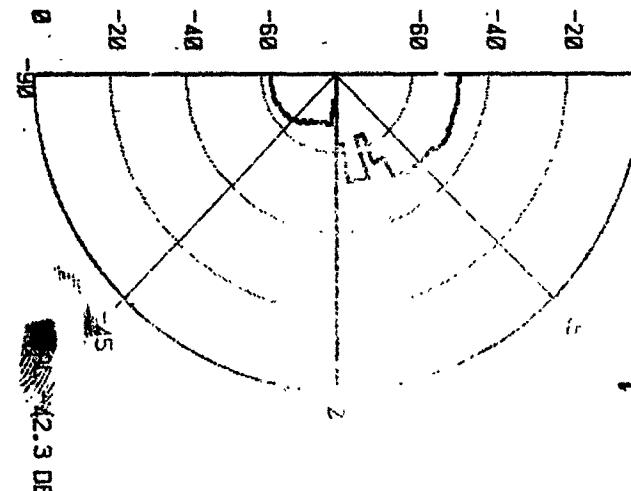
-60  
-40  
-20  
0

-185-

## ARRIVAL ANGLE



## NOISE (DB)



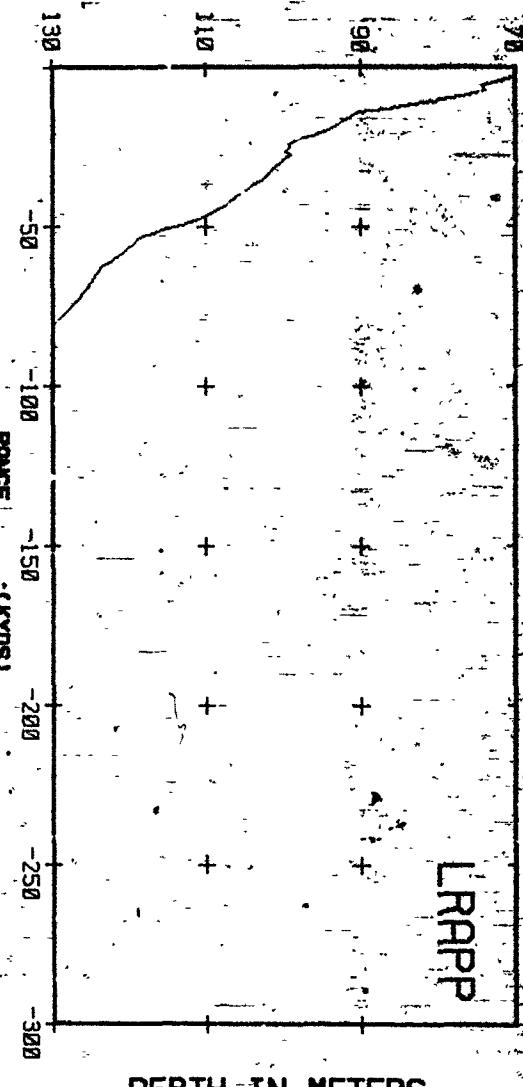
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

1969 08 SUMMER S 288 R 154 F 120

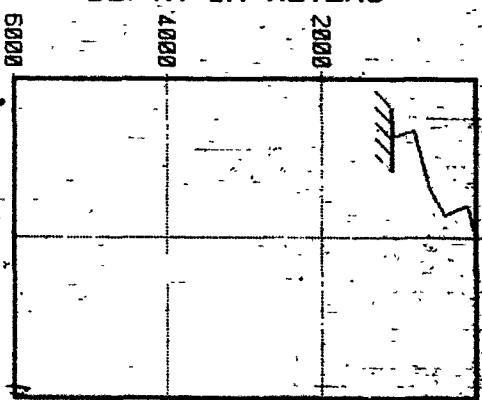
1450 1500 1550

LRAPP

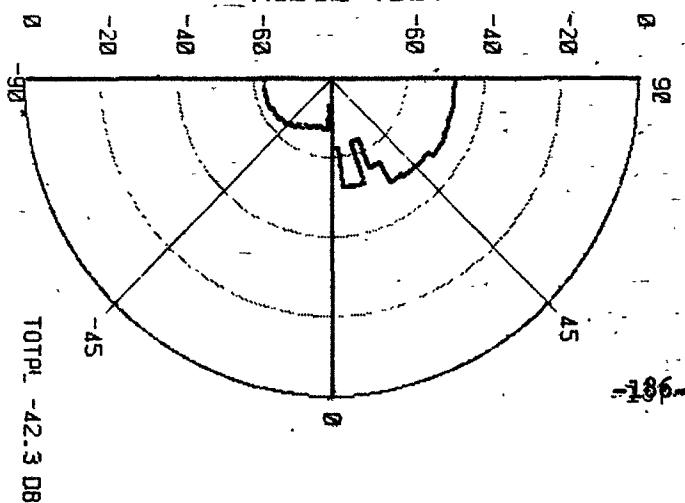
DB LOSS



DEPTH IN METERS



NOISE (DB)



ARRIVAL ANGLE

40

70

FINGER AB SISTER

S 20 R 2625 F 1.1M

1450 Hz 1500

1550

L<sub>eff</sub>(dB)

NOISE

1777

## DB LOSS

90

110

+

+

+

+

+

+

+

+

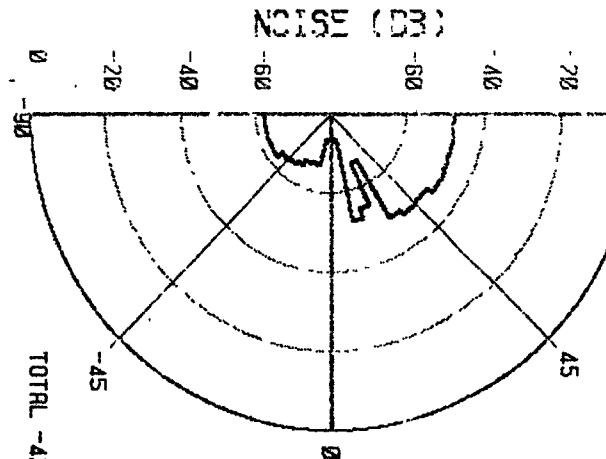
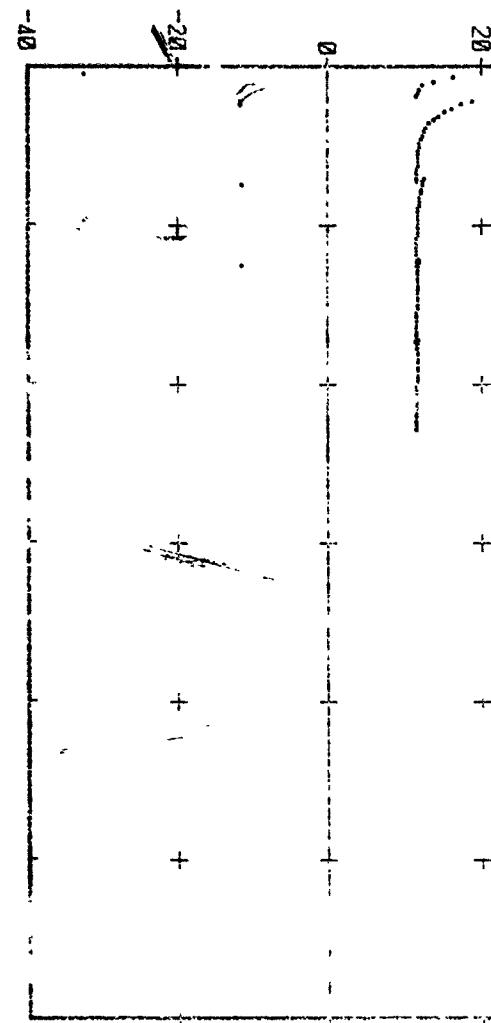
+



0 90  
-180 -120 -60

-187-

## ARRIVAL ANGLE



TOTAL -42.6 dB

REC'D BY SINGER

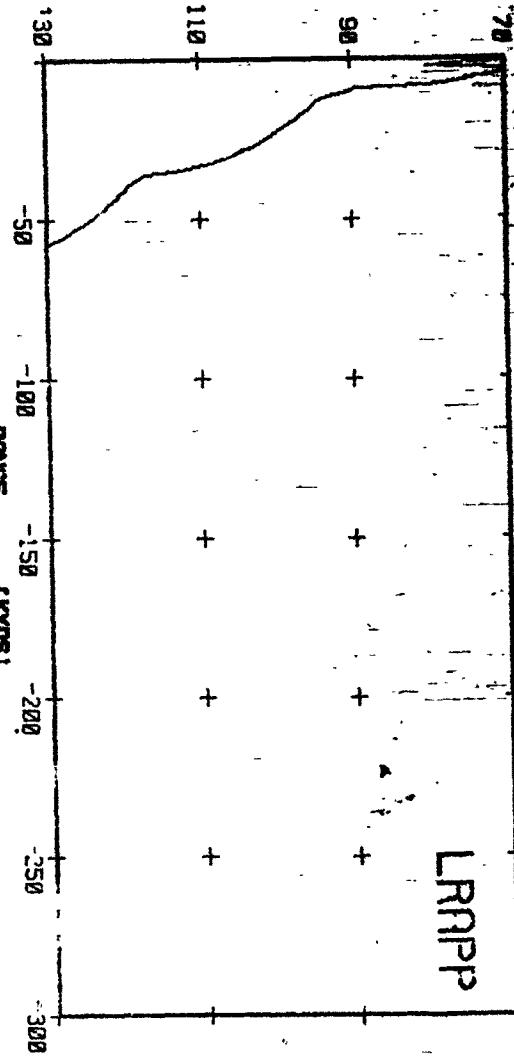
S 58 R 2625 F 1120

1450 M/S 1520 1550

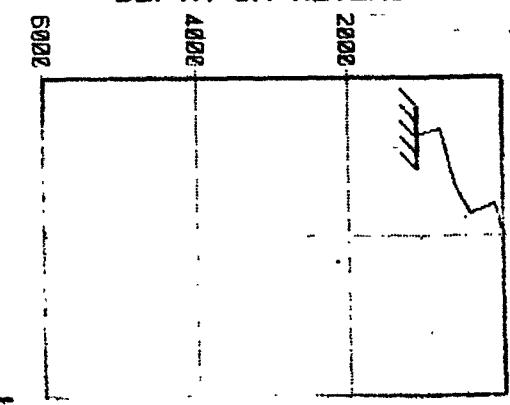
1550

### LRNPP

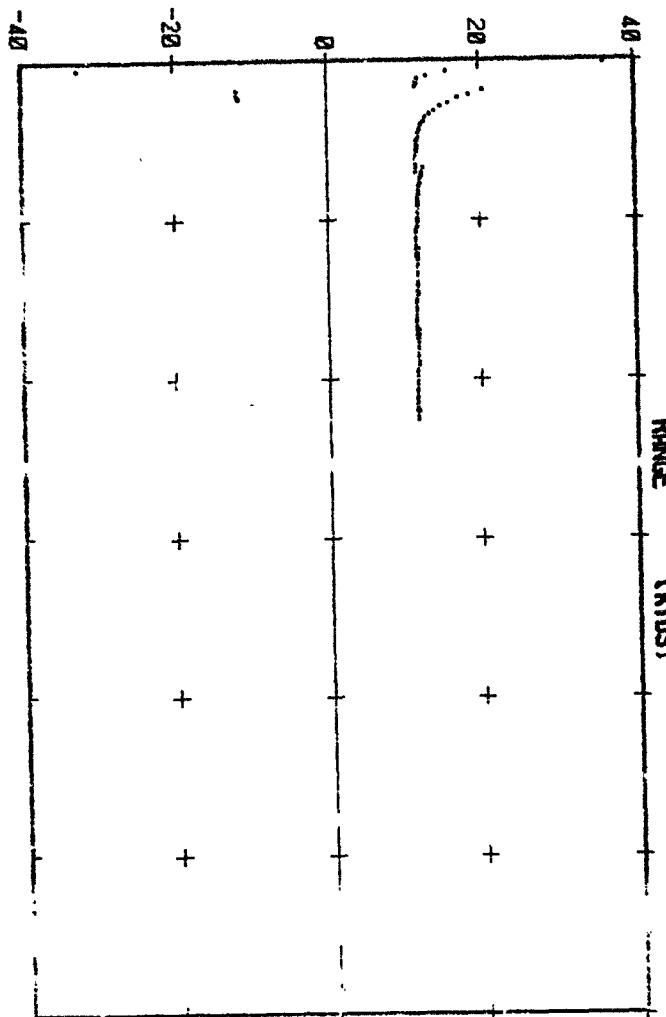
### DB LOSS



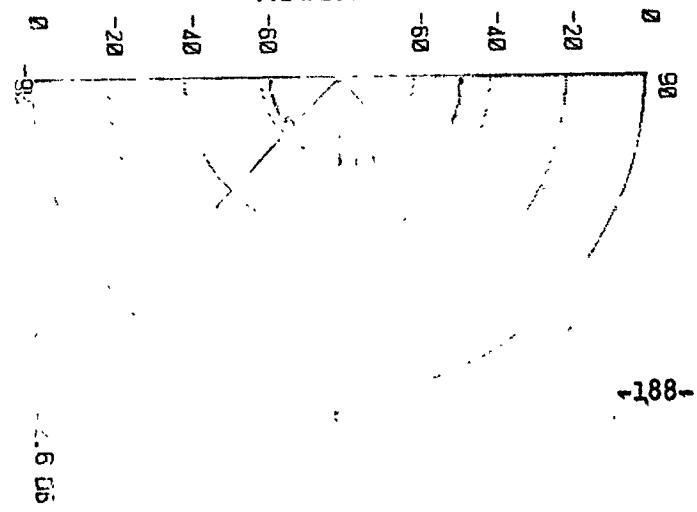
### DEPTH IN METERS



### ARRIVAL ANGLE



### NOISE (DB)

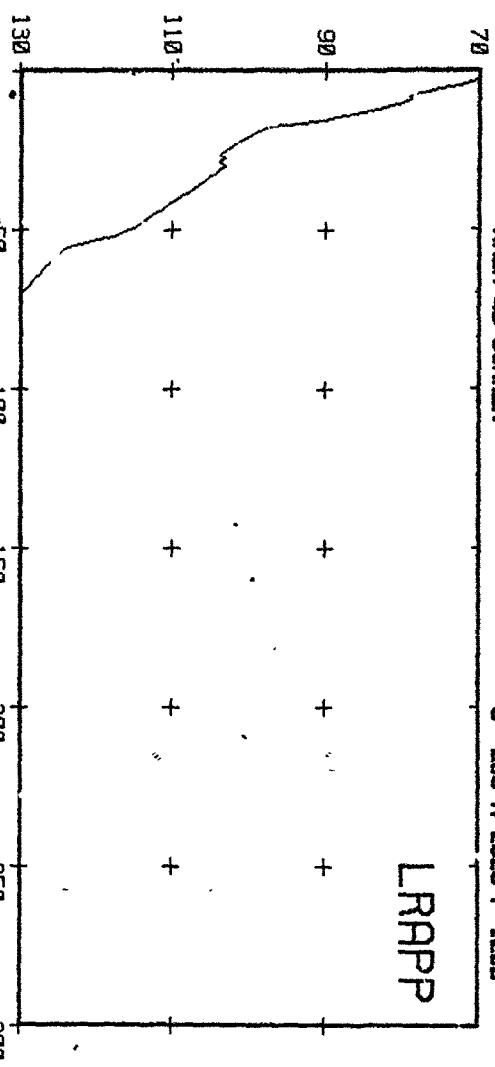


AER 4B SUMMER

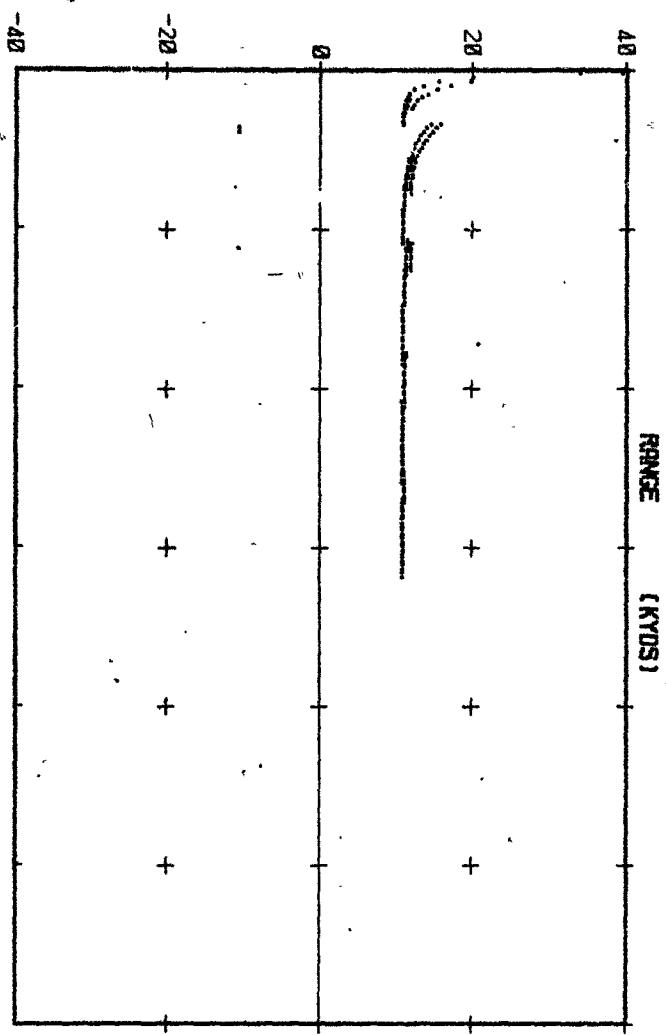
S 268 R 2625 F 1200

1450 M/S 1500 1550

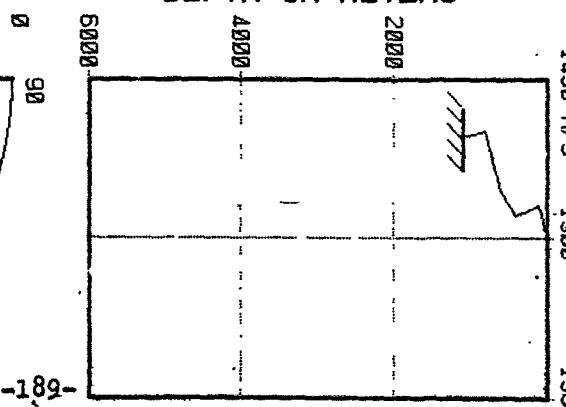
### DB LOSS



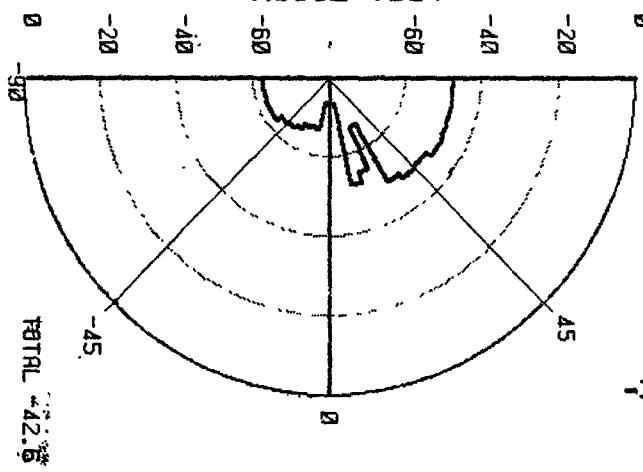
### ARRIVAL ANGLE



### DEPTH IN METERS



### NOISE (DB)



DATA -42.5 DB

76

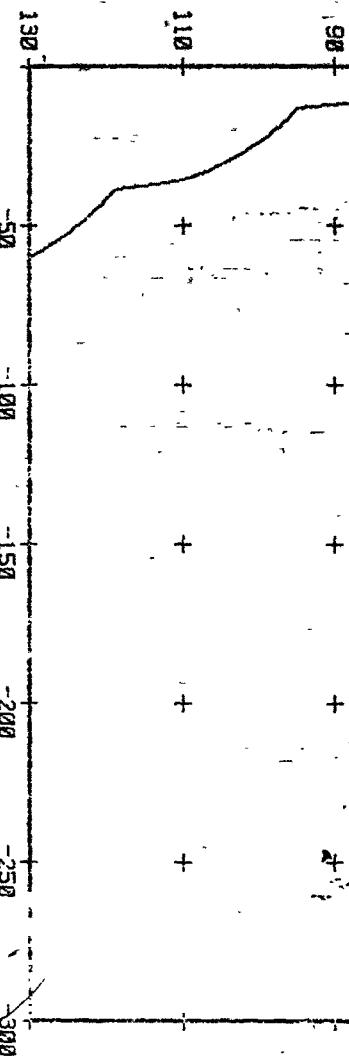
GROVE AIR SIMMER

S 28 R 3588 F 1200

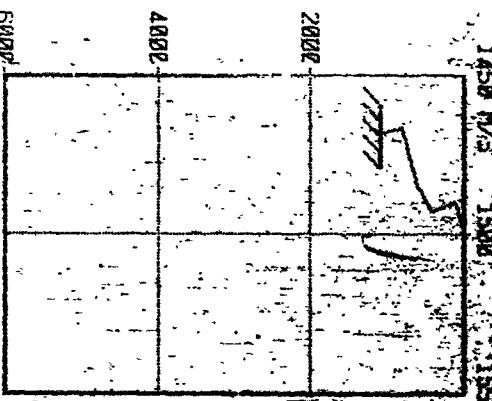
1450 MARS 1500

LR OPP

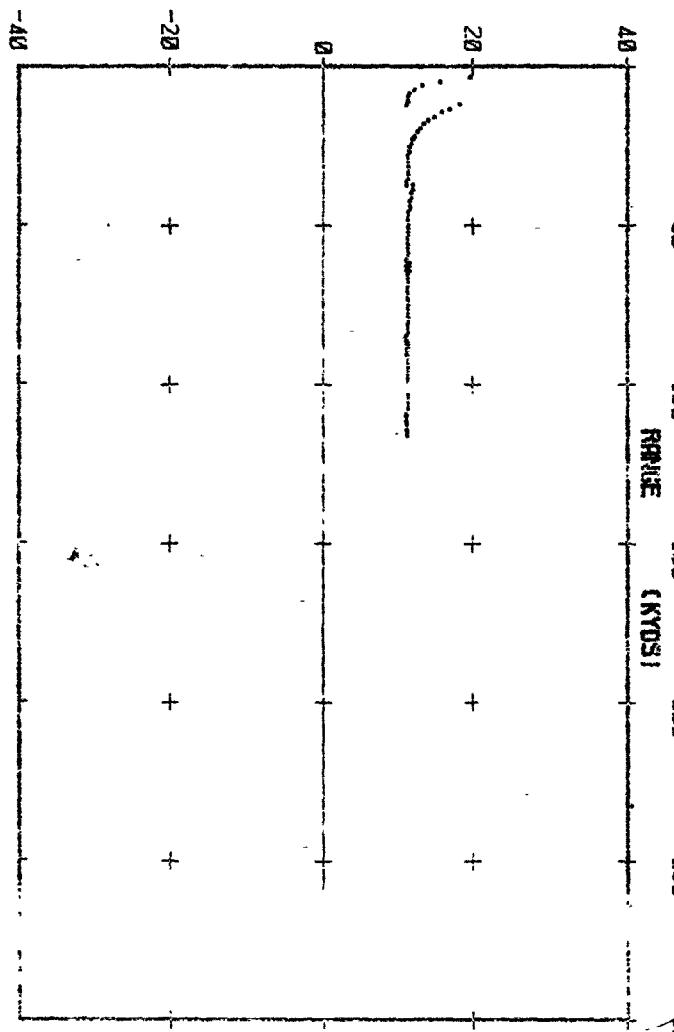
## DB LOSS



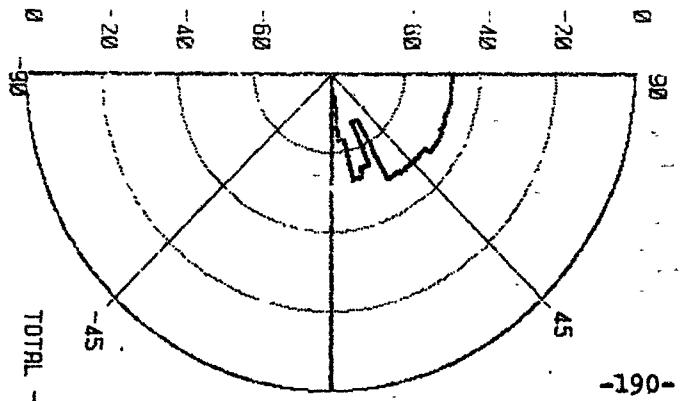
## DEPTH IN METERS



## ARRIVAL ANGLE



## NOISE (DB)



TOTAL -42.8 DB

70

AREA AB SUMMER

S SR R 3588 F 1232

145.5 N

LRNPP

## DB LOSS

130  
120  
110  
100  
90

DEPTH IN METERS

0  
2000  
4000  
6000

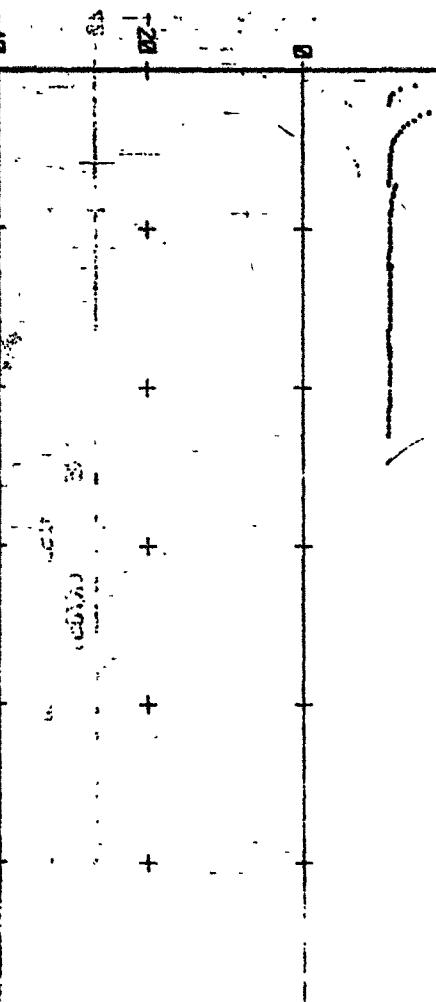
-191-

## ARRIVAL ANGLE

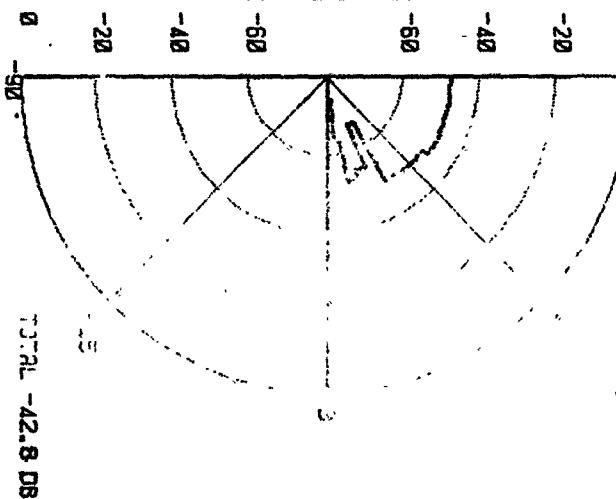
20

-20  
-40  
-60  
-80  
-100  
-120

NOISE (KHZ)



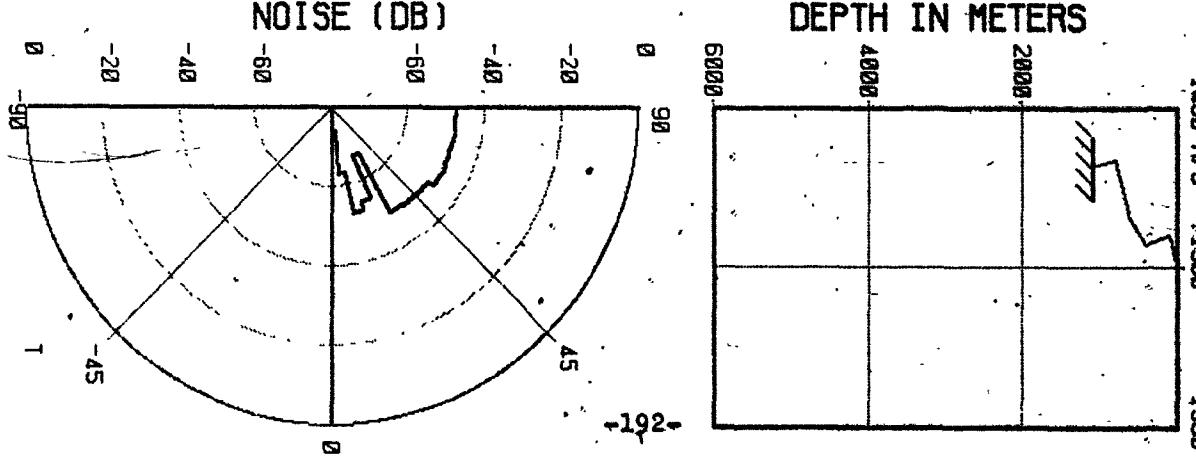
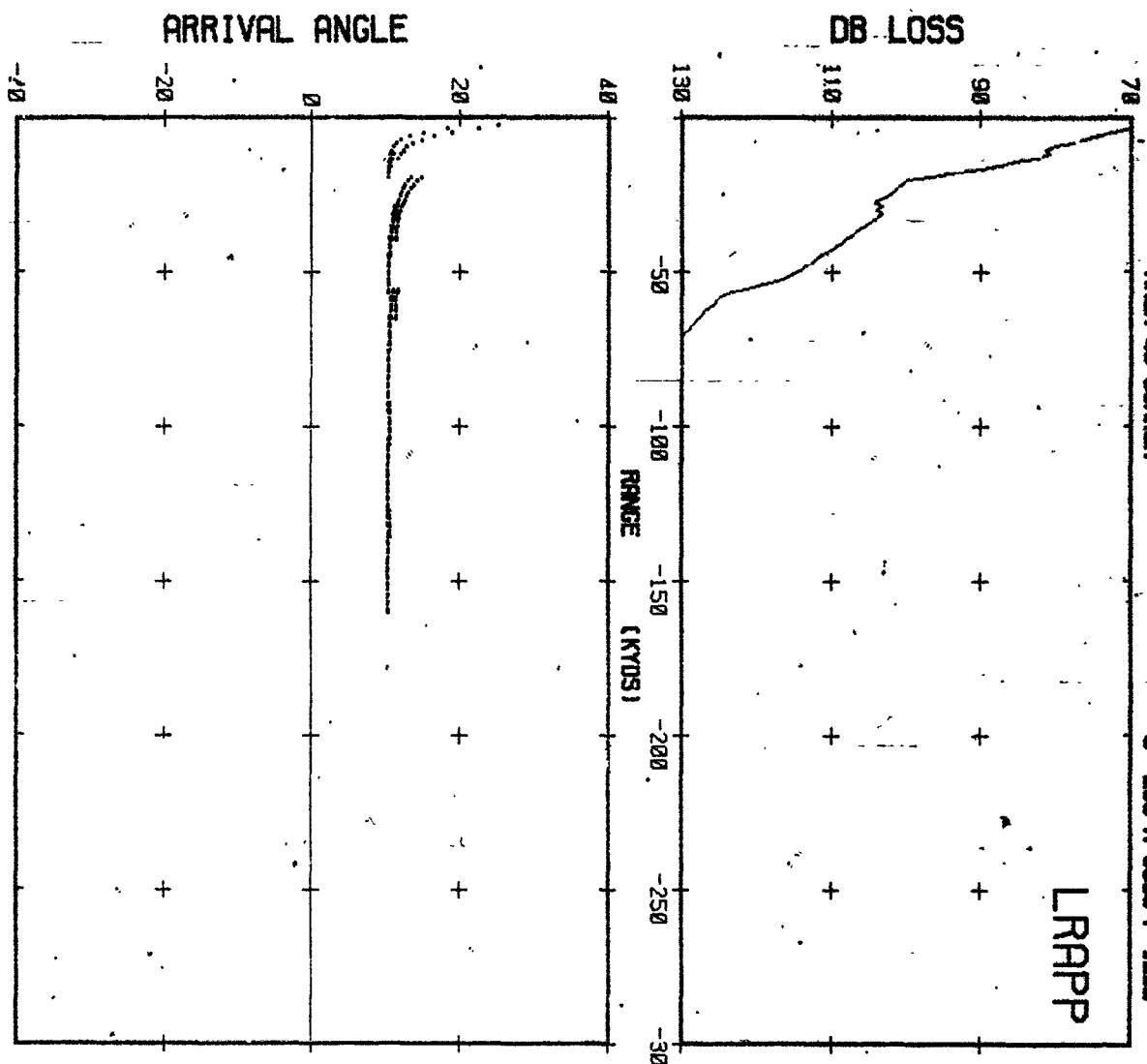
## NOISE (DB)

0  
20  
40  
60-191-  
-42.8 DB

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2008 SEPTEMBER

1559 W/S 1560



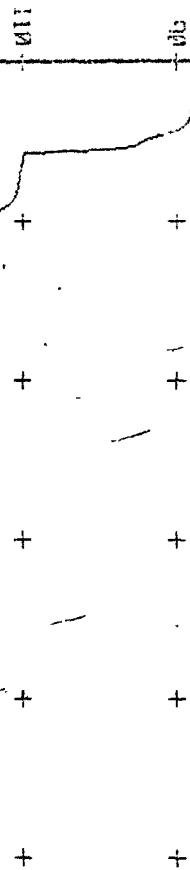
RIVER AB SUMMER

S 29 R 60 F 2000

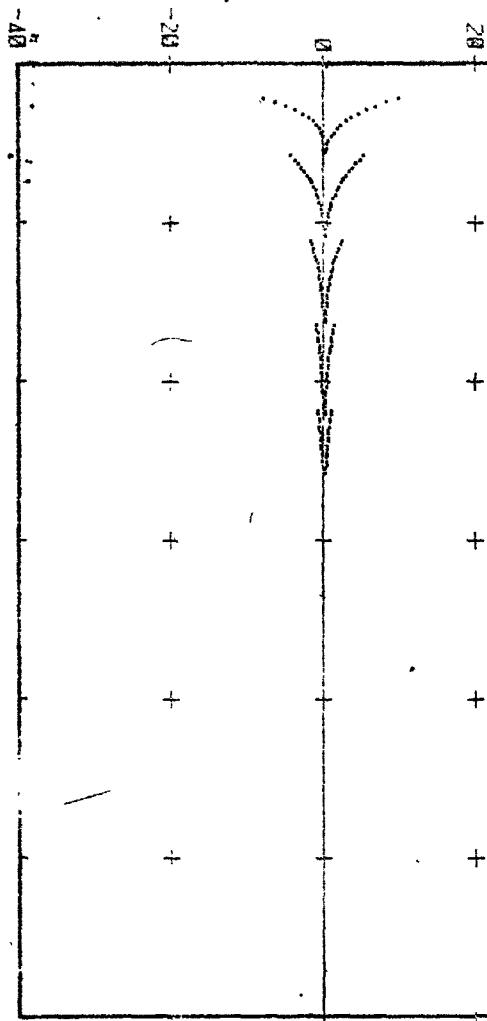
1450 M/S 1500 1550

LRAPP

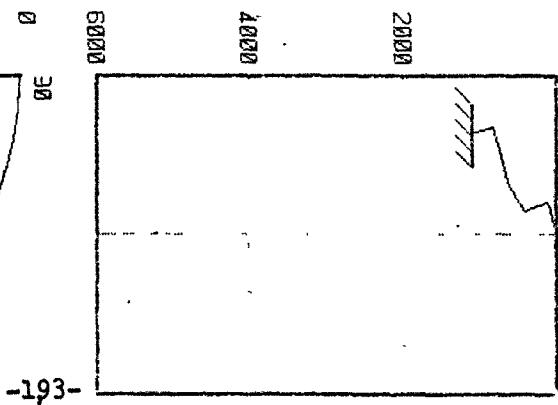
DB LOSS



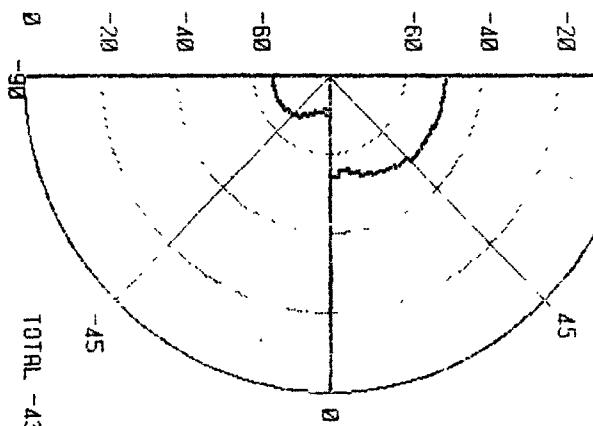
ARRIVAL ANGLE



DEPTH IN METERS



NOISE (DB)



-193-

TOTAL -43.8 DR

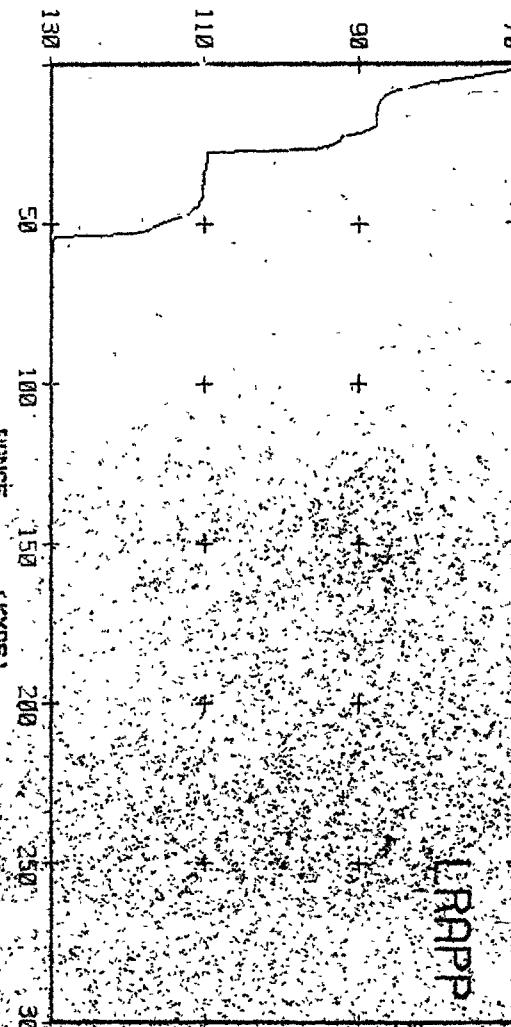
AREA 4B SUMMER

S 34° 56' R 69° E 2000

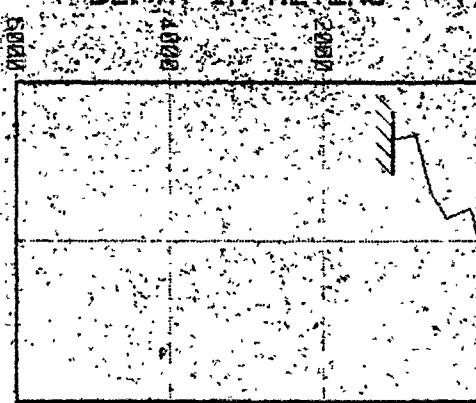
1450 M/S 1500 1550

### L RAPP

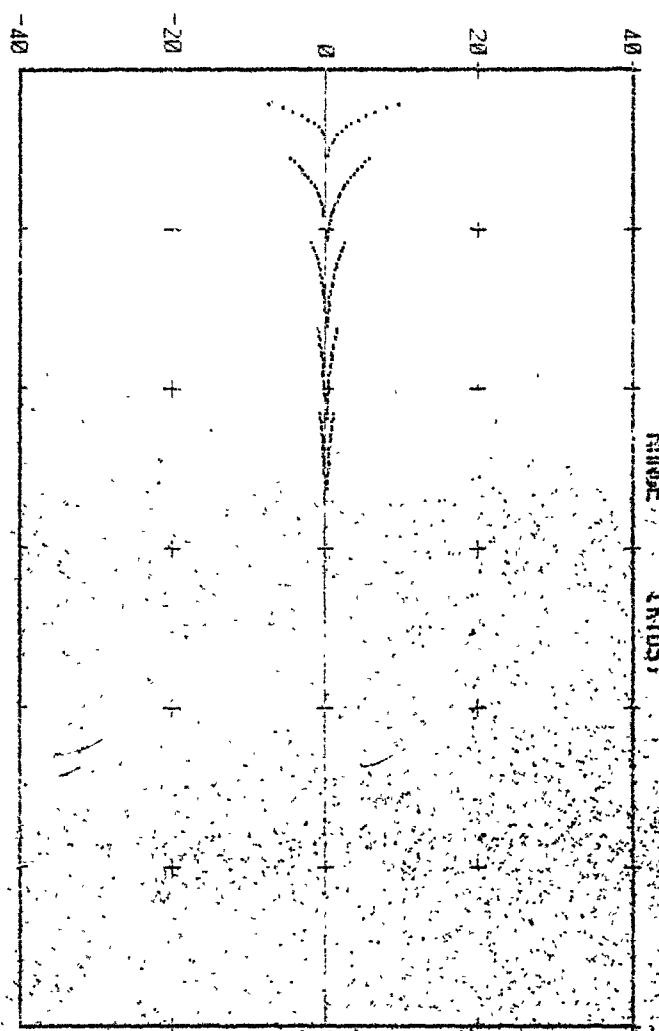
#### DB LOSS



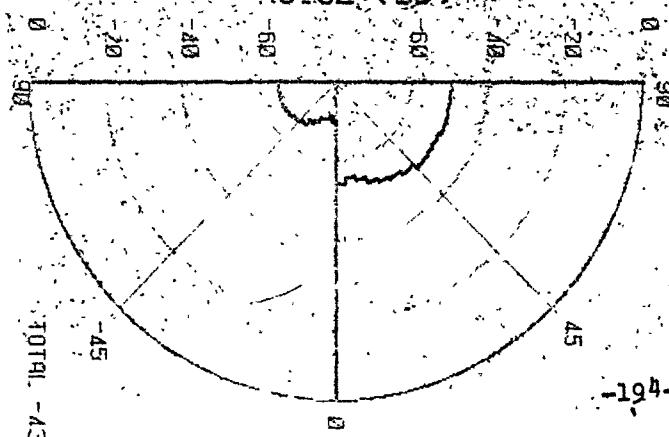
#### DEPTH IN METERS



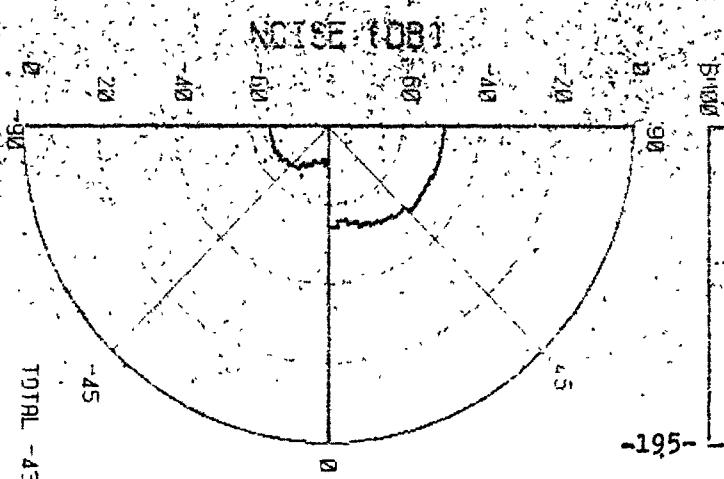
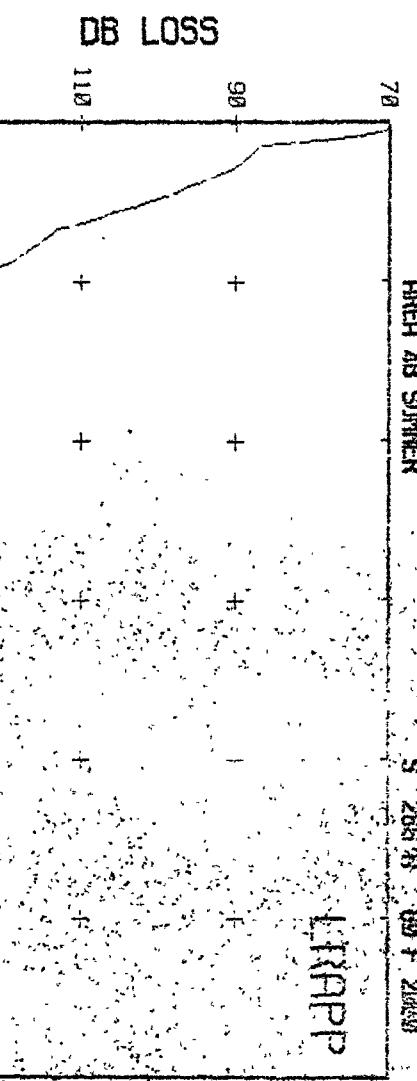
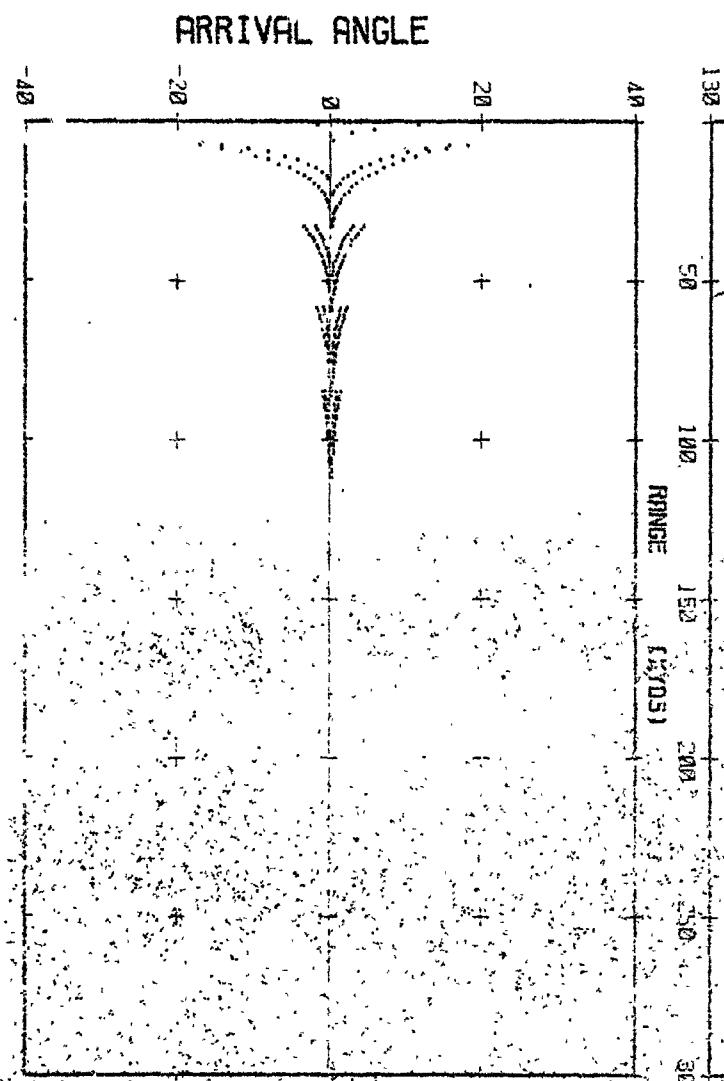
#### ARRIVAL ANGLE



#### NOISE (DB)



TOTAL. -43.8 DB



-195-



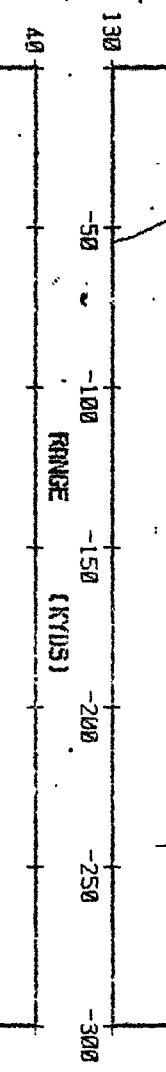
FIREN AB SUMMER

S 20 R 163 F 2000

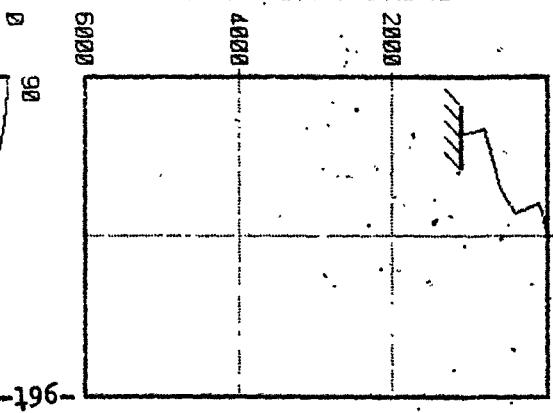
1450 M/S 1500 1550

LRAPP

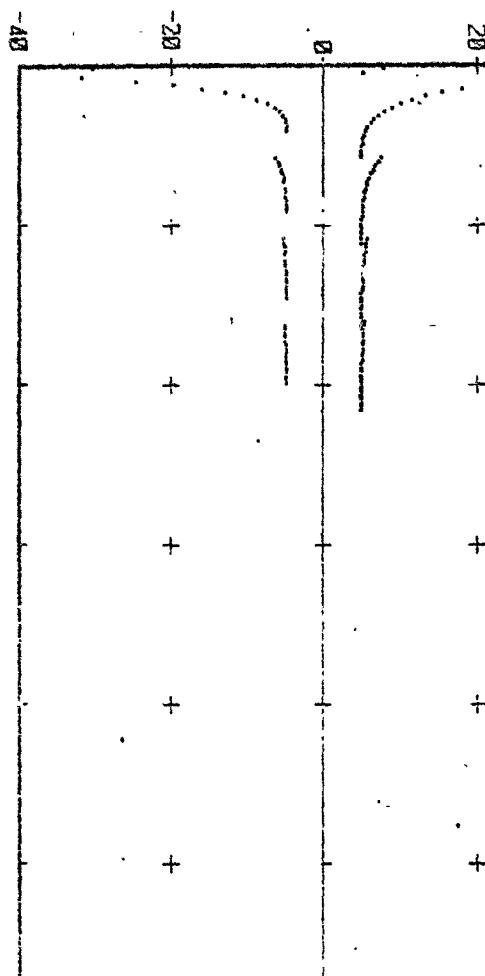
DB LOSS



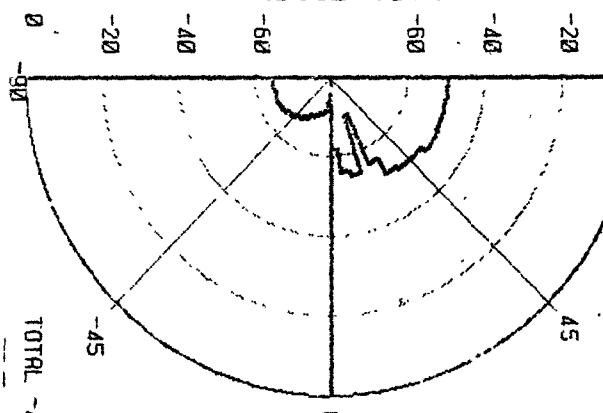
DEPTH IN METERS



ARRIVAL ANGLE



NOISE (DB)



TOTAL -44.6 DB

-96-

ARRIVED 43 SUMMER

S : 54 R : 163 F : 2000

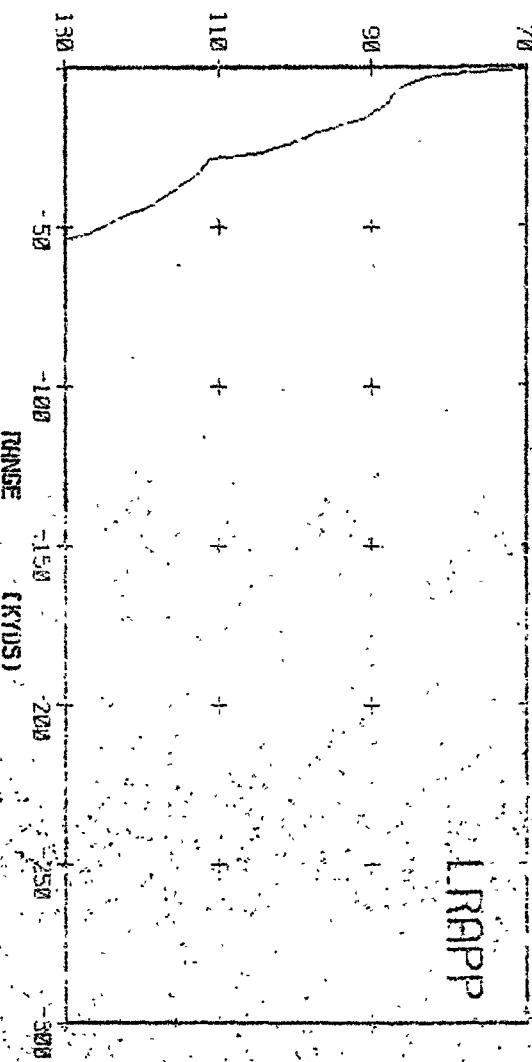
1453 m/s 1500 1550

70

L RAPP

100  
90  
80  
70  
60  
50  
40  
30  
20  
10  
0

DB LOSS

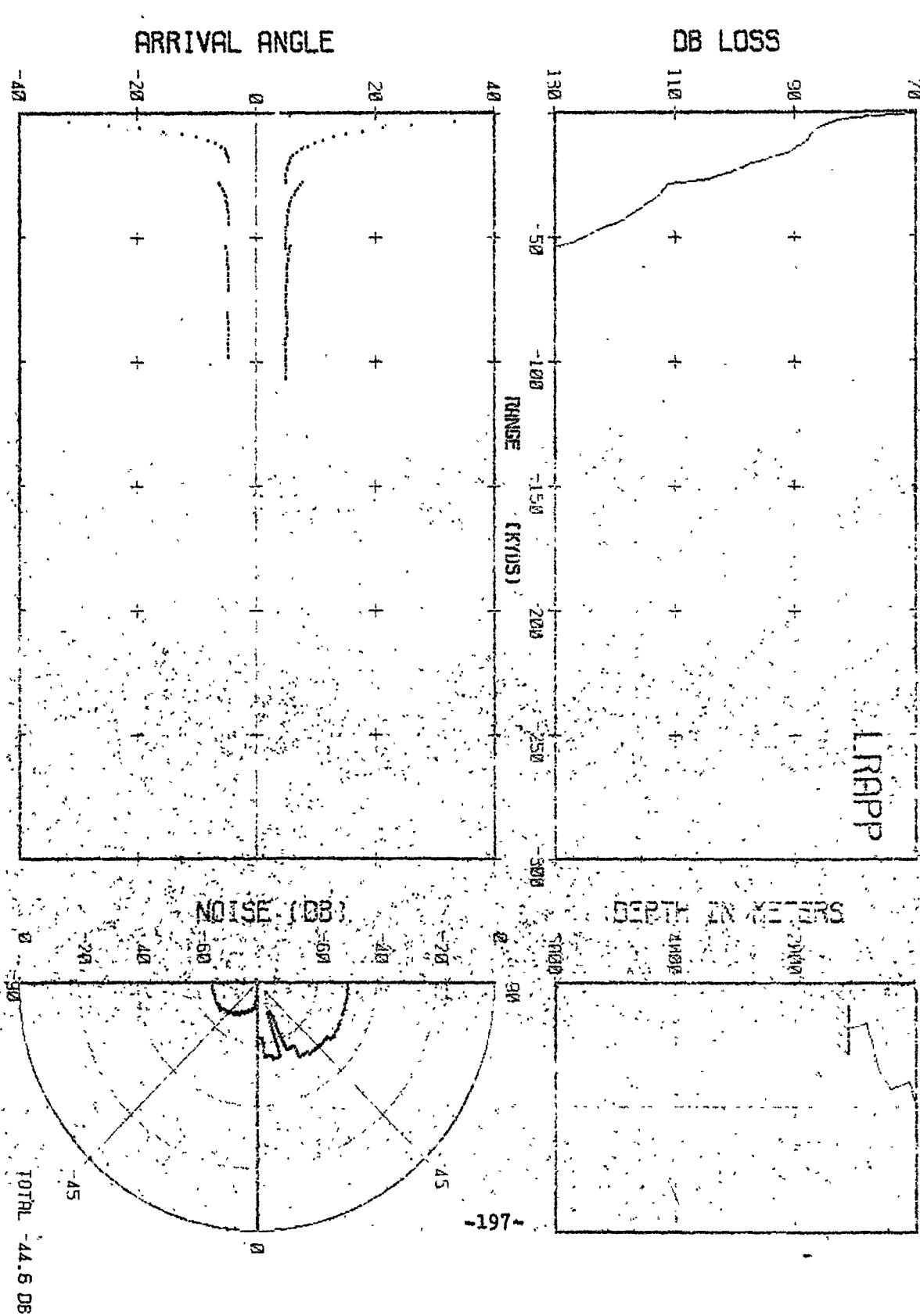


DEPARTURE

ARRIVAL

NOISE (DB)

100  
90  
80  
70  
60  
50  
40  
30  
20  
10  
0

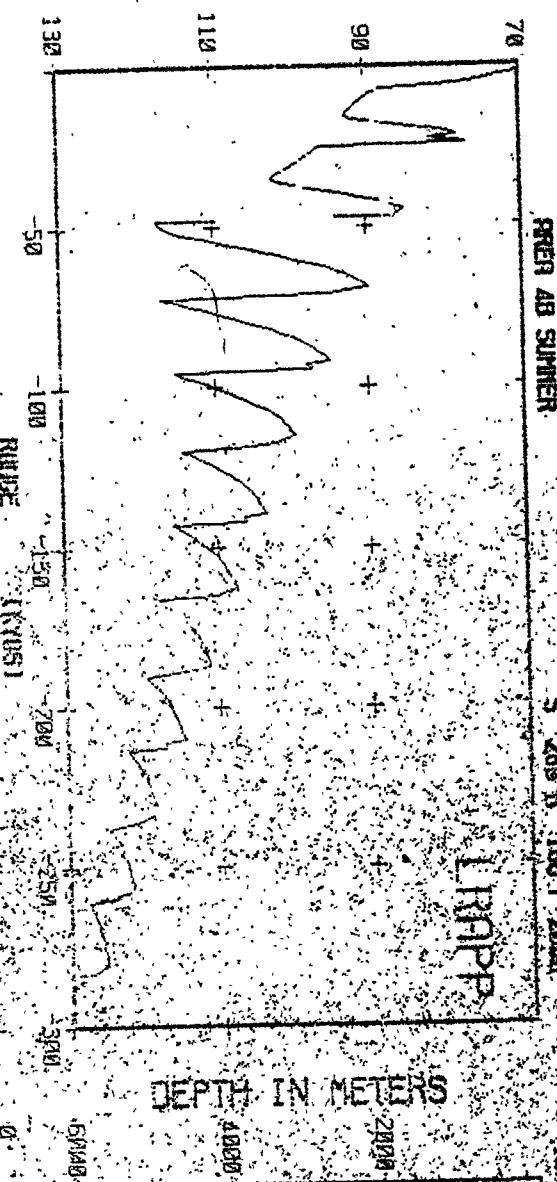


AKER AB SUMMER

S 26° 11' 180° F 2024

1450 M/S 1500 1550

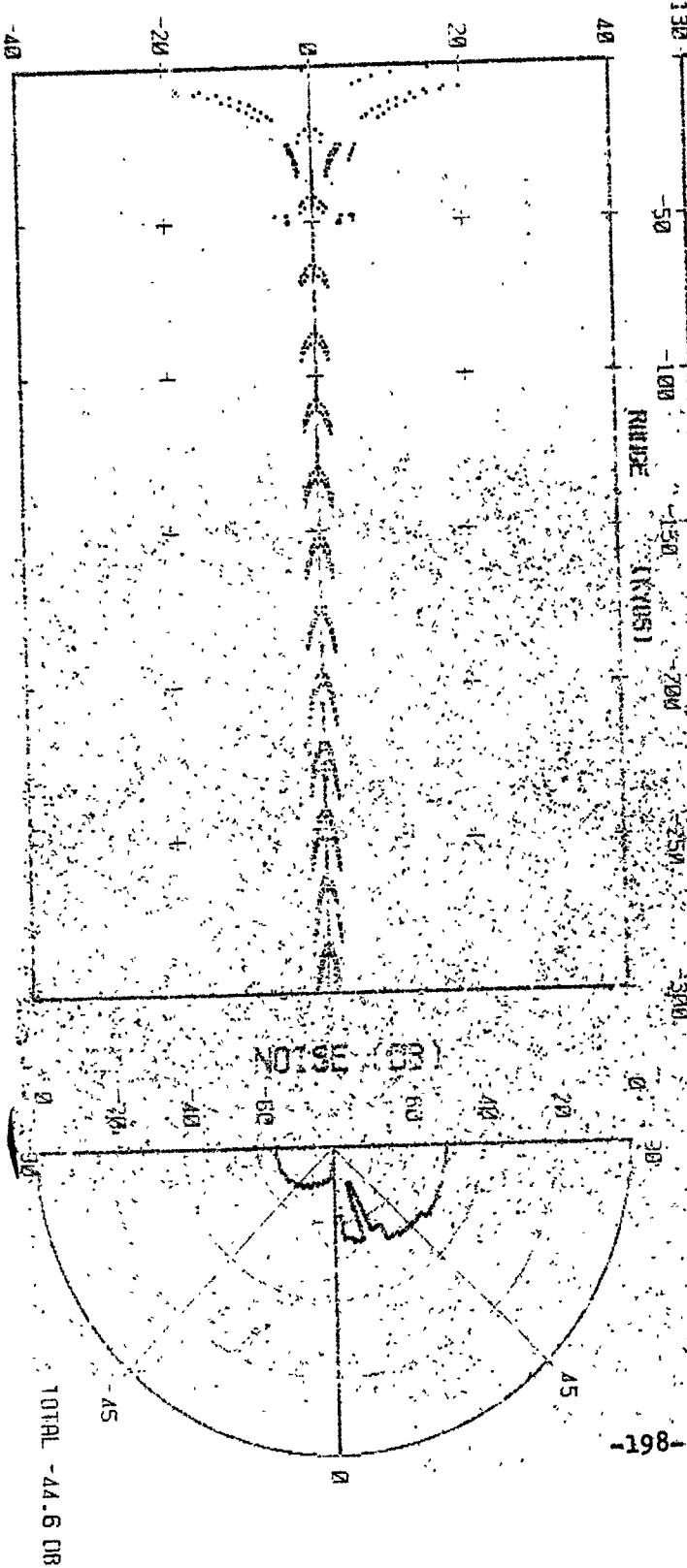
### DB LOSS



### DEPTH IN METERS



### ARRIVAL ANGLE



79

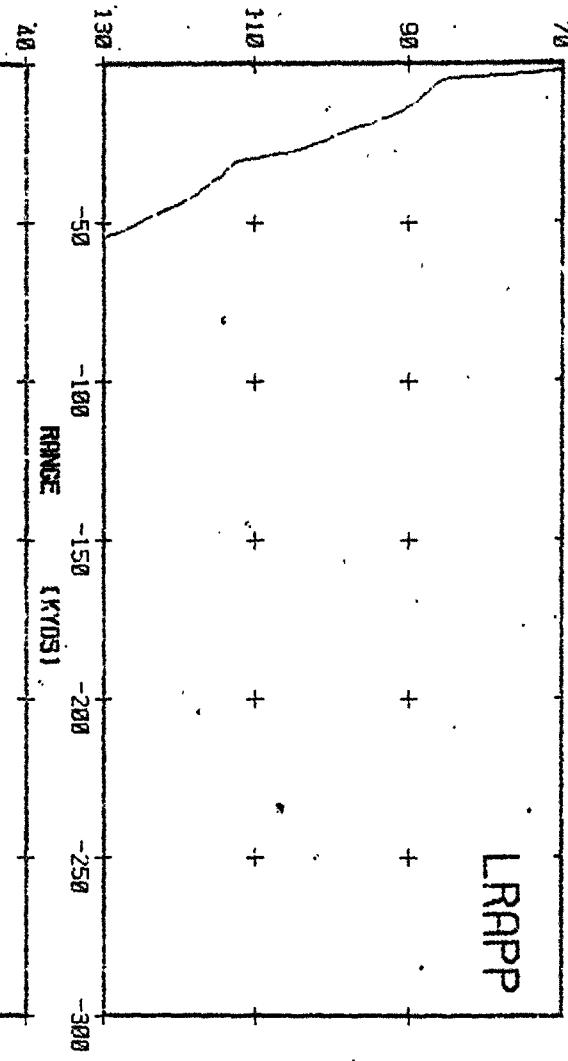
FRIED 4B SUMMER

S - 28 R 300 F 2000

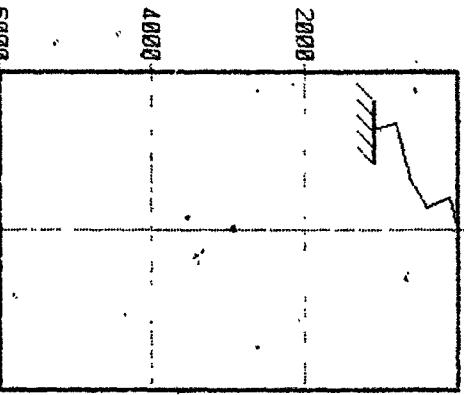
1450 M/S 1500 1550

LRAPP

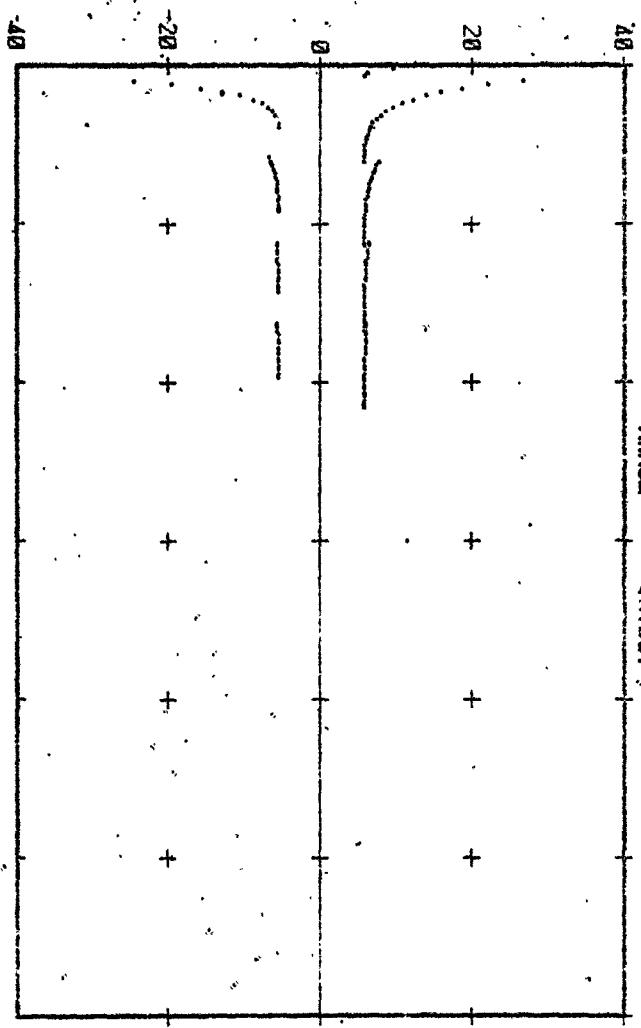
## DB LOSS



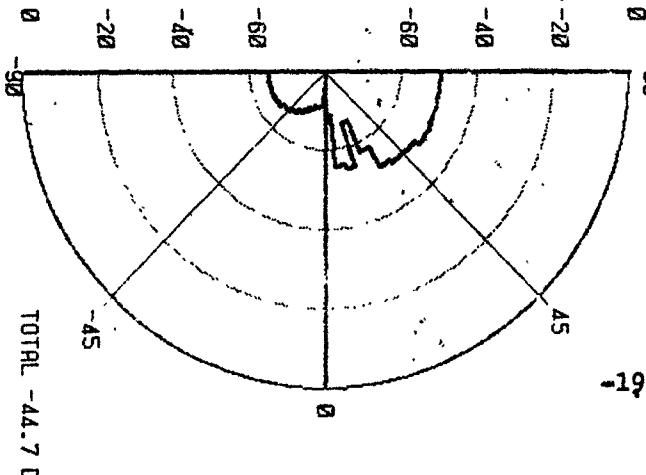
## DEPTH IN METERS



## ARRIVAL ANGLE



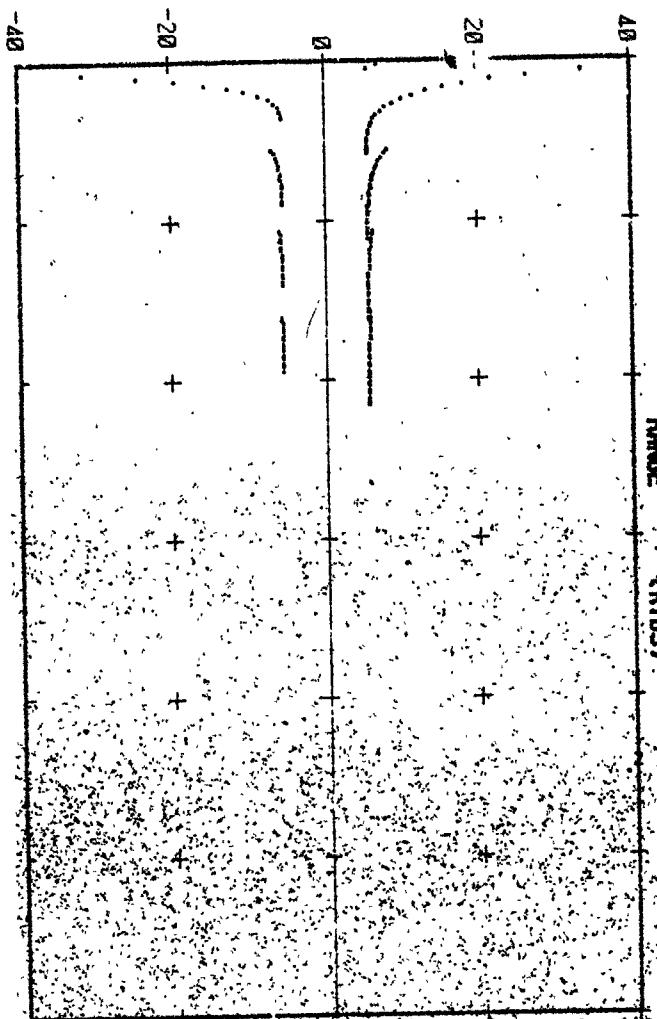
## NOISE (DB)



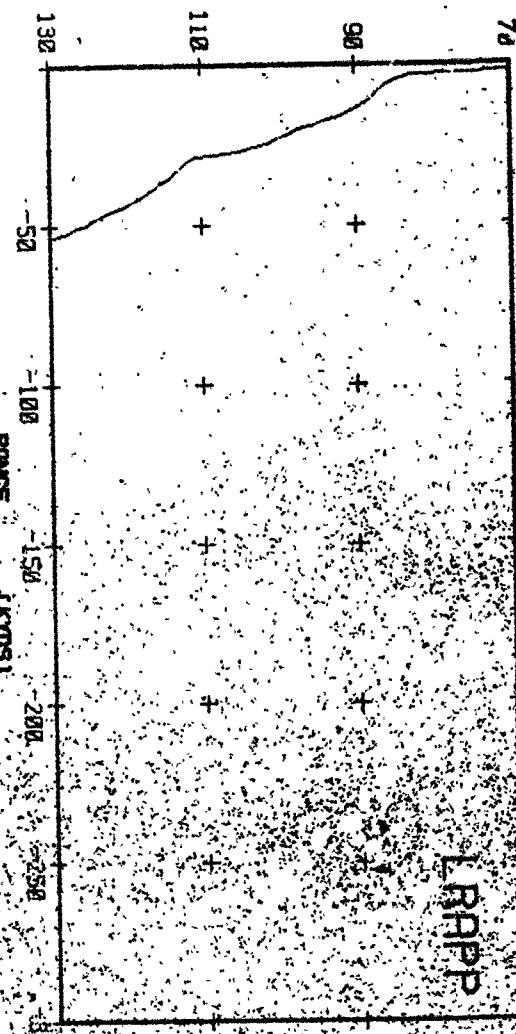
TOTAL -44.7 DB

-199-

### ARRIVAL ANGLE



### DB LOSS



RIVER AB SUMMER

5 30 10 20 30 40

200

150 100 50

200

150

200

150

200

150

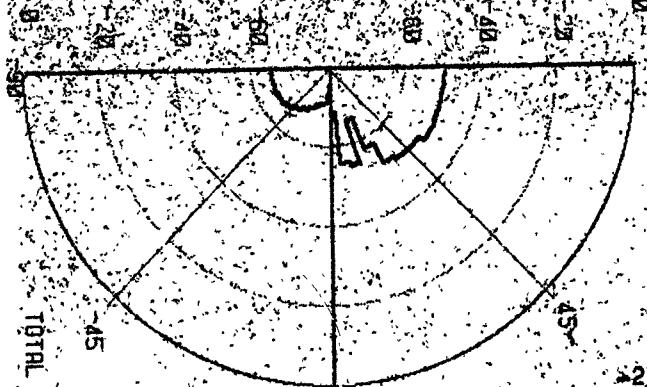
200

LAPP

### DEPTH IN METERS



### NOISE (DB)



TOTAL -44.7 DB

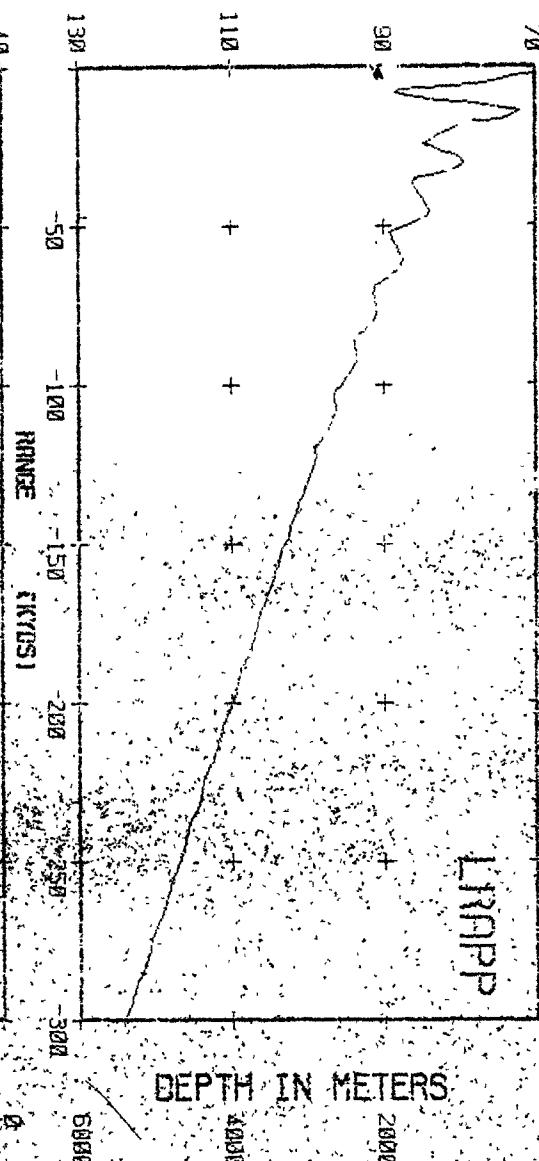
AREA 4B SUMMER

S 268 R 37W F 2000

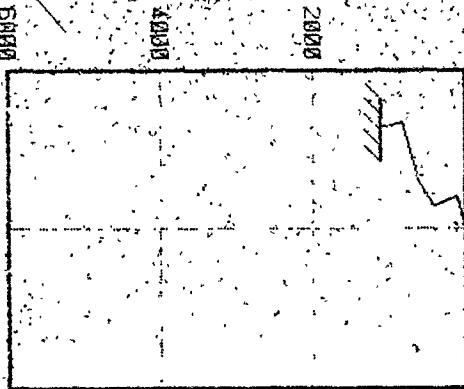
1750 M.S. 1500. 1550

URAPP

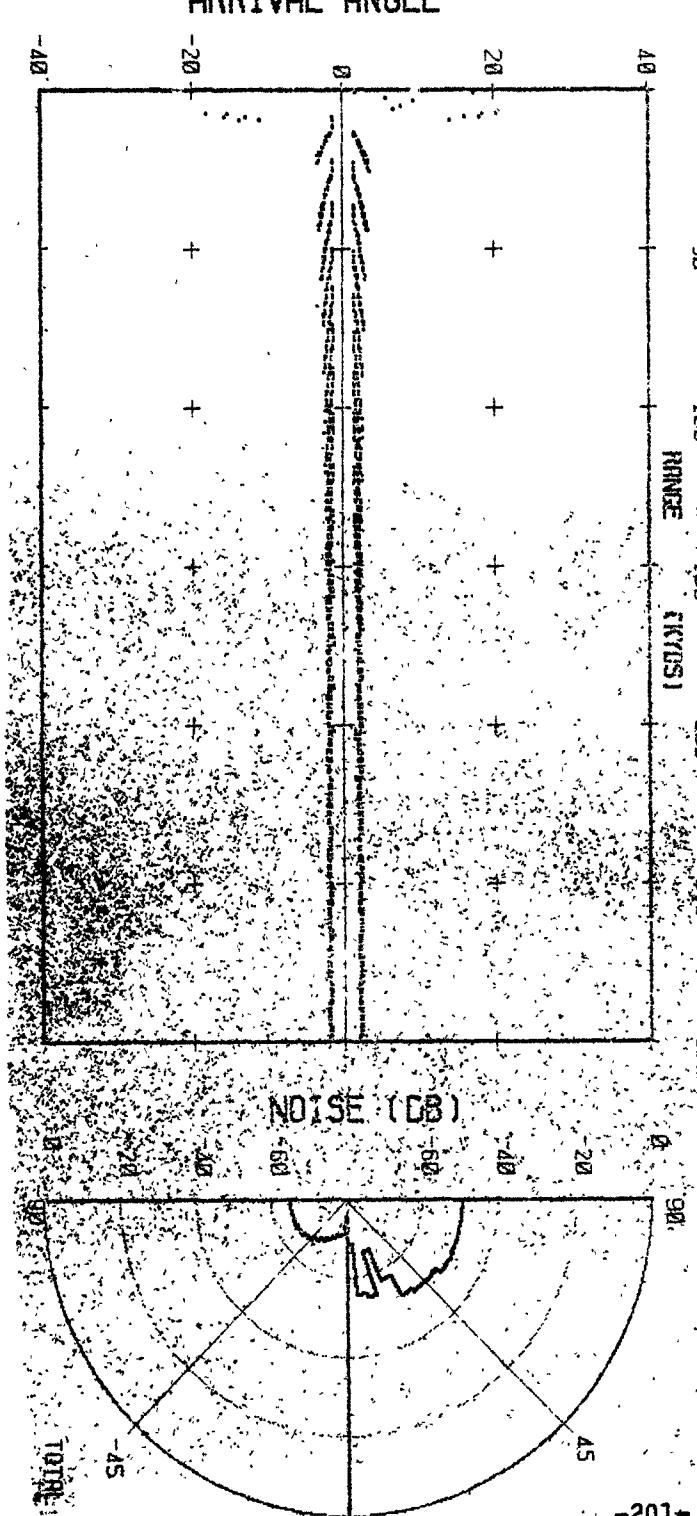
DB LOSS



DEPTH IN METERS



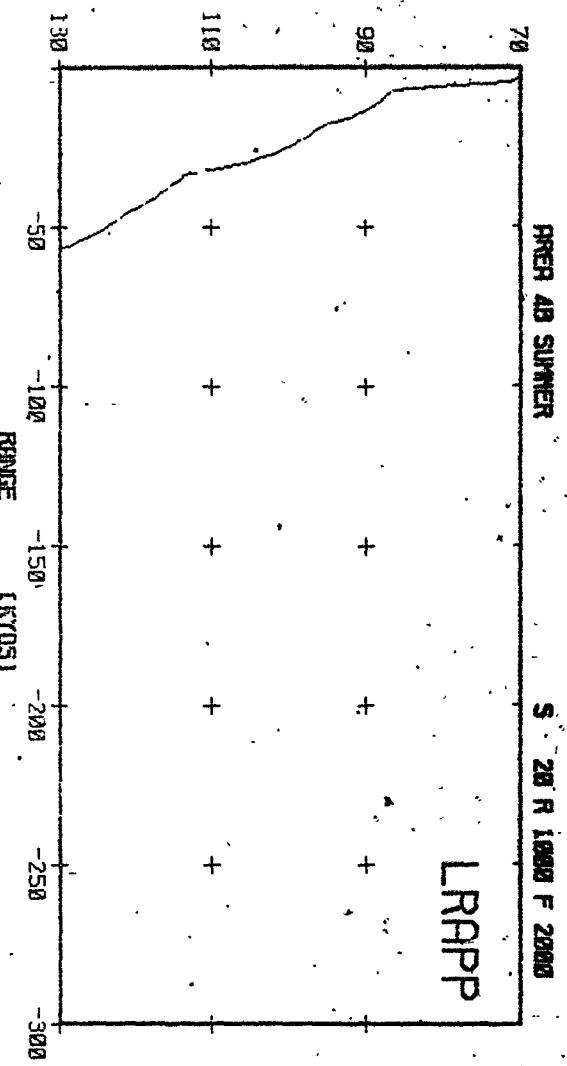
NOISE (DB)



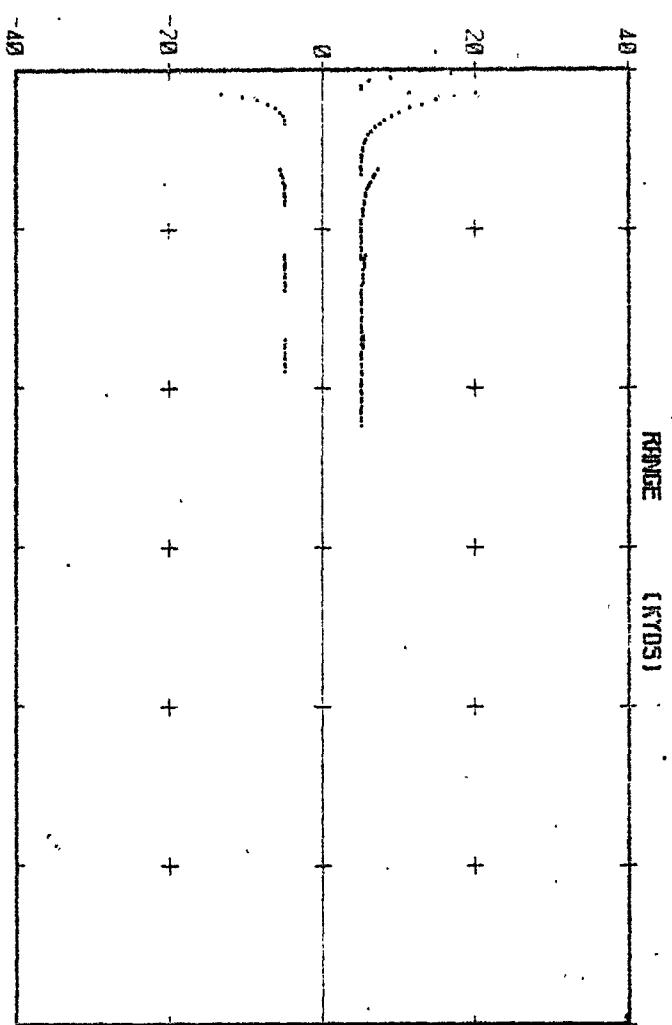
TIME 14:7 DB

-201-

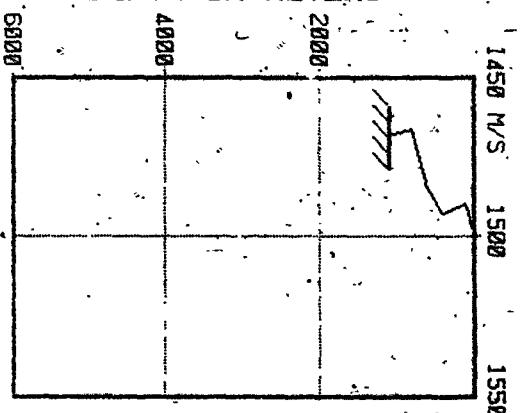
### DB LOSS



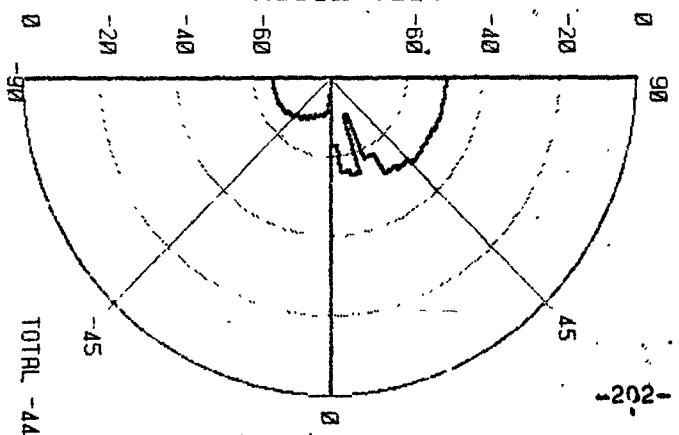
### ARRIVAL ANGLE



### DEPTH IN METERS



### NOISE (DB)



TOTAL -44.7 DB

-40

AER 43 SUMMER

S 59°R 120W F 2053

1450 M/S 1500 1550

73

LRRPP

DB LOSS  
90 + + + + + + + +

110 + + + + + + + +

130 + + + + + + + +  
-50 -100 -130 -160 -190 -220 -250 -300

RANGE (KMS)

80 70 60 50 40 30 20 10 0

B

D

-203-

ARRIVAL ANGLE

20 + + + + + + + +  
0 + + + + + + + +  
-20 + + + + + + + +

60 45 30 15 0

N

S

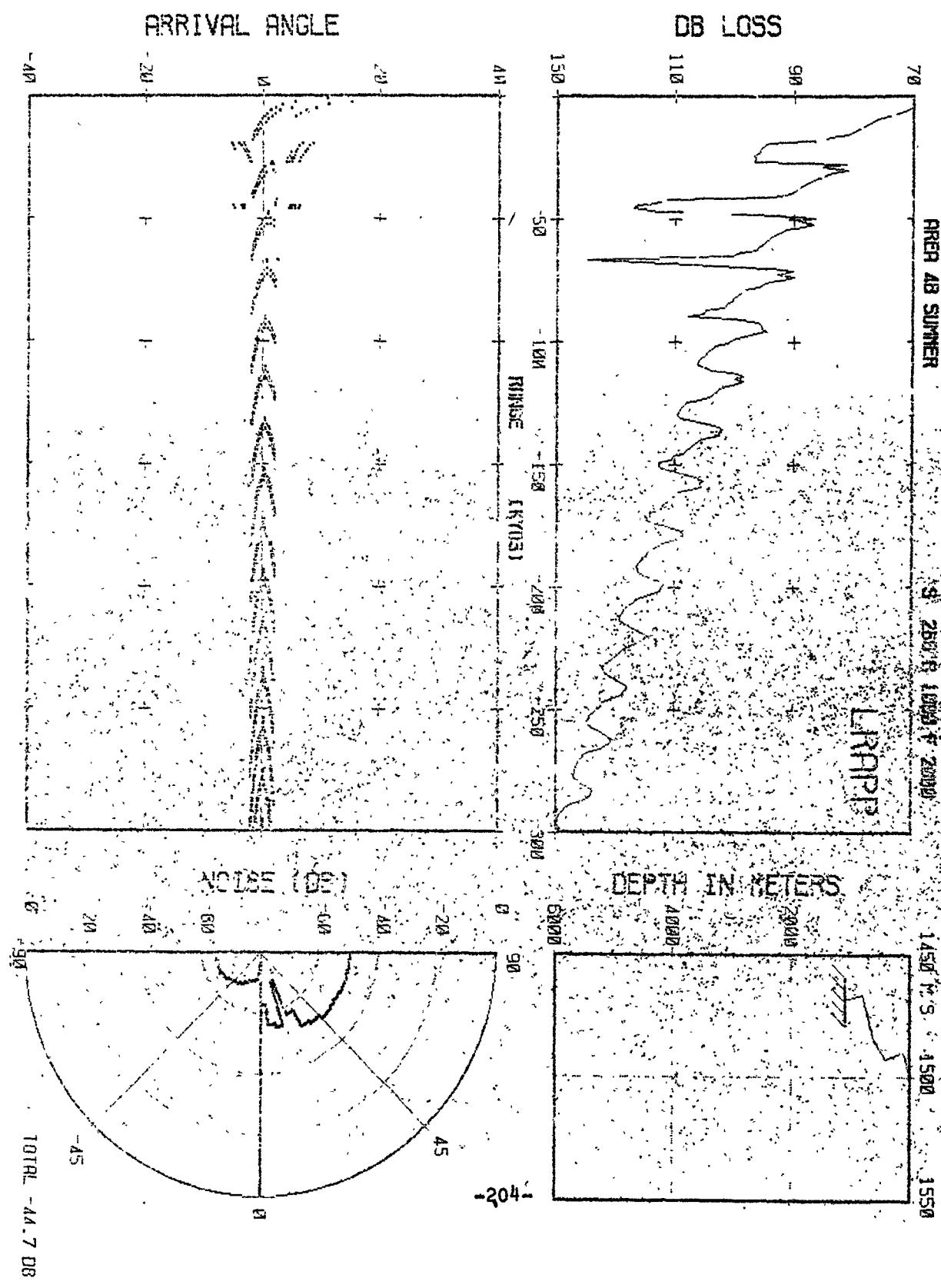
-40

E

W

TOTAL -44.7 DB

45 30 15 0 -15 -30 -45



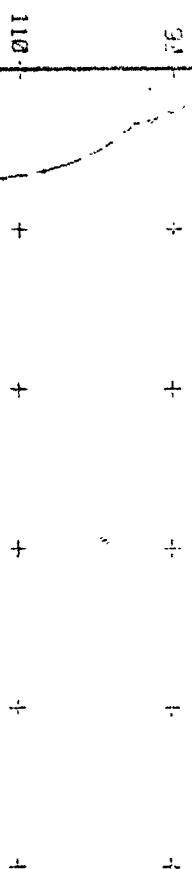
FREQUENCIES SUMMER

S 20 R 1312 F 2000

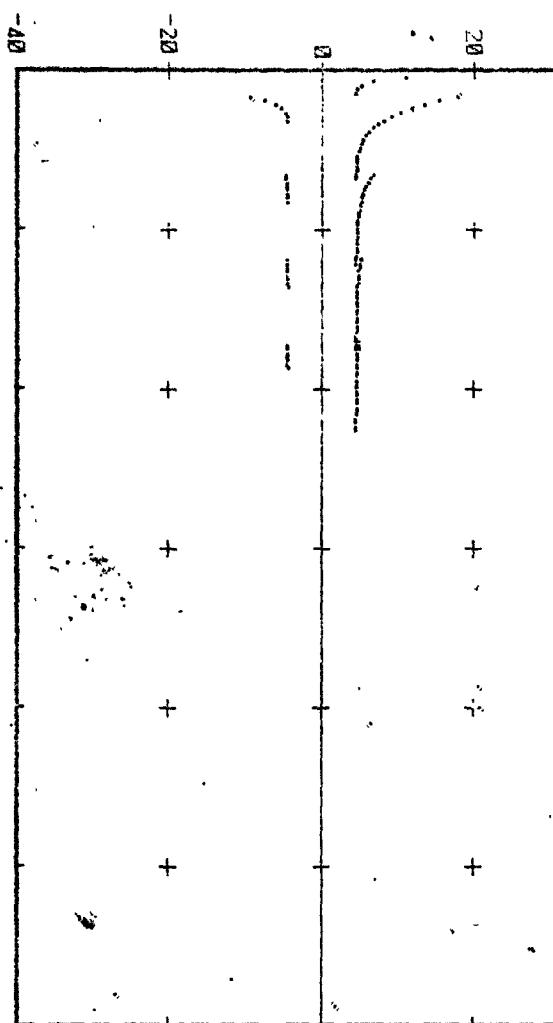
1450 M/S 1500 1550

LRFAPP

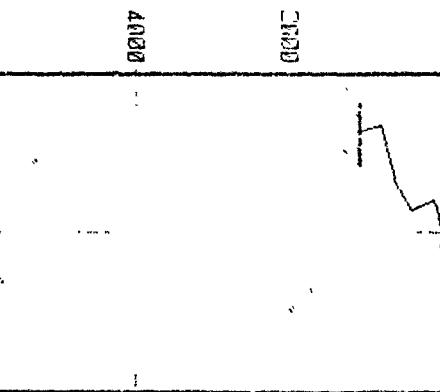
DB LOSS



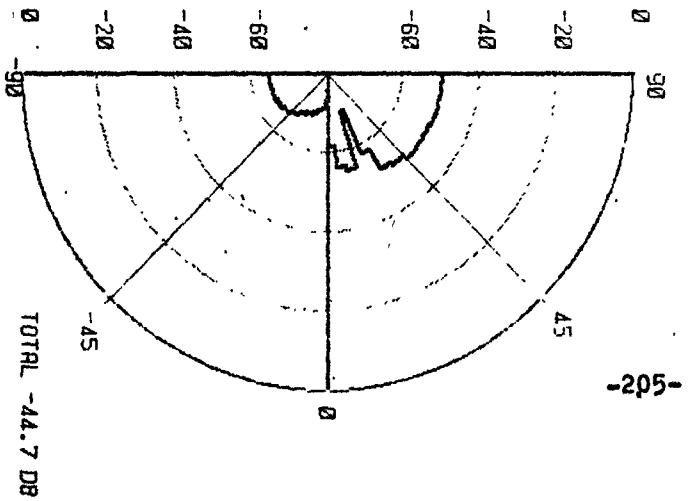
ARRIVAL ANGLE



DEPTH IN METERS



NOISE (DB)



70

AREA AB SUMMER

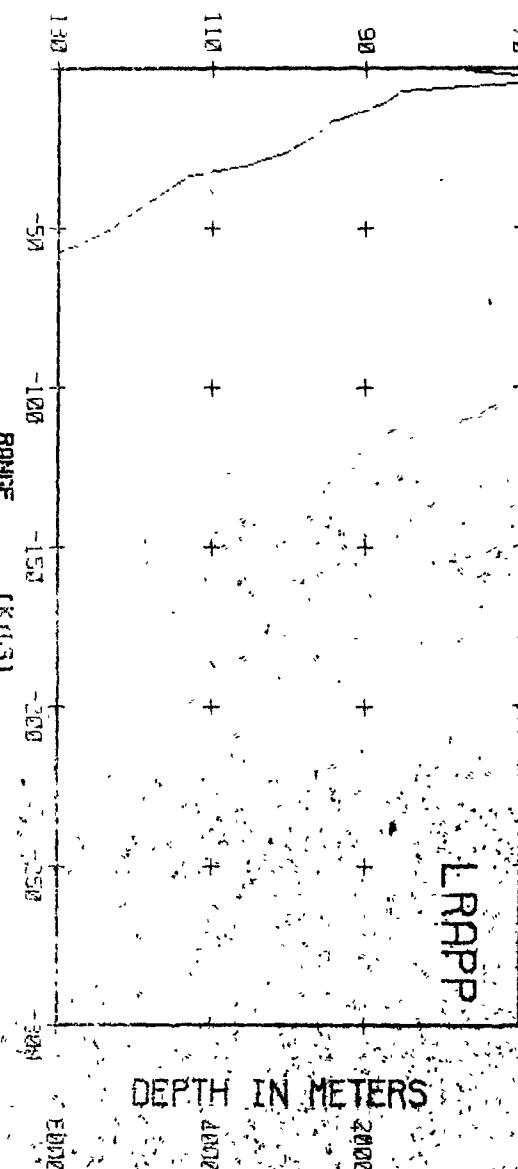
S 52 R 312 F 2000

1450 M/S

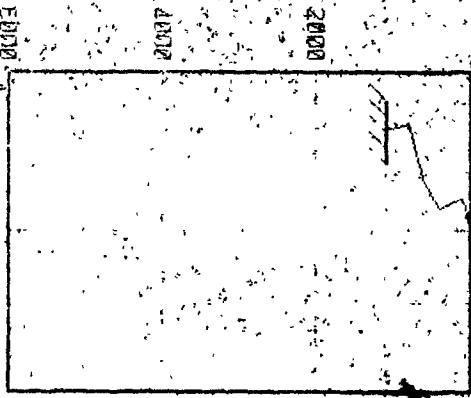
1500 1550

L RAPP

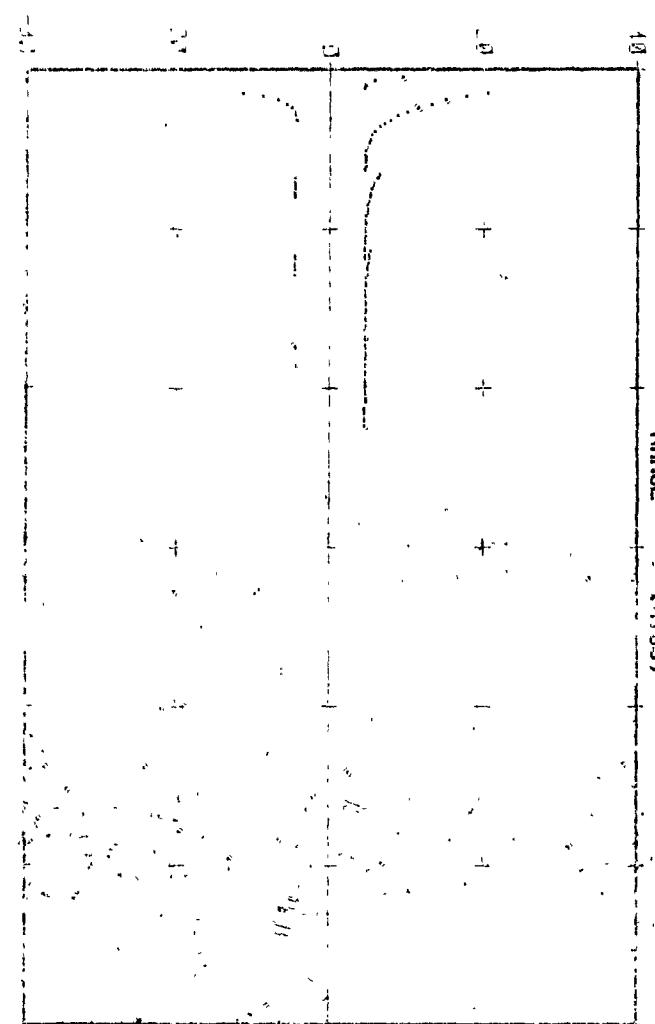
## DB LOSS



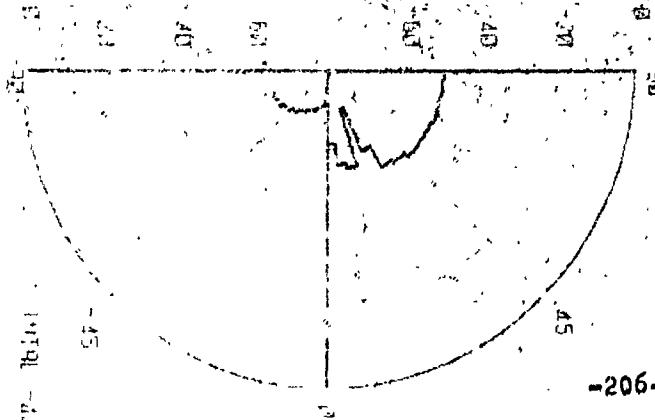
## DEPTH IN METERS



## ARRIVAL ANGLE



## NOISE (DB)



-206-

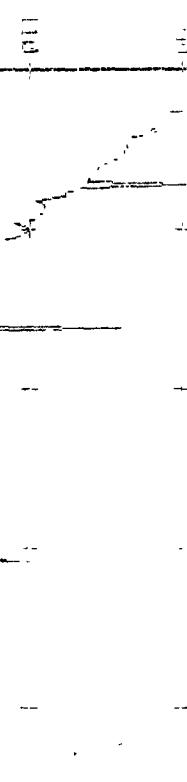
107.0 -44.7 DR

FEB 48 SUMMER

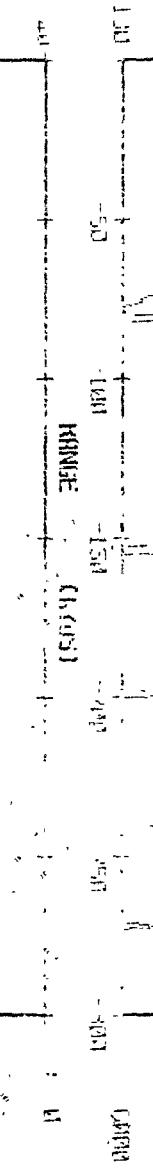
3 DEC 1942 P 2300

LAMP M S 156W 154P

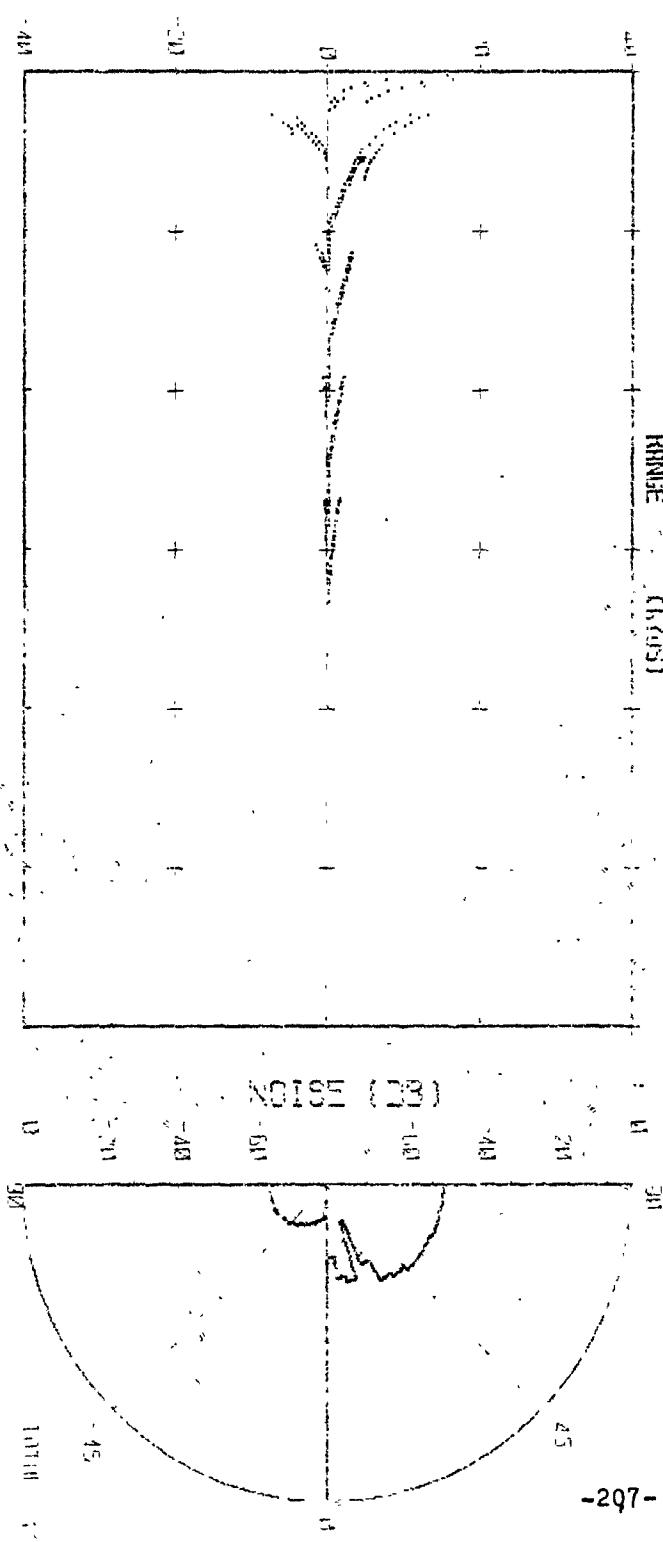
### DB LOSS



CEP 5  
12 miles



### ARRIVAL ANGLE



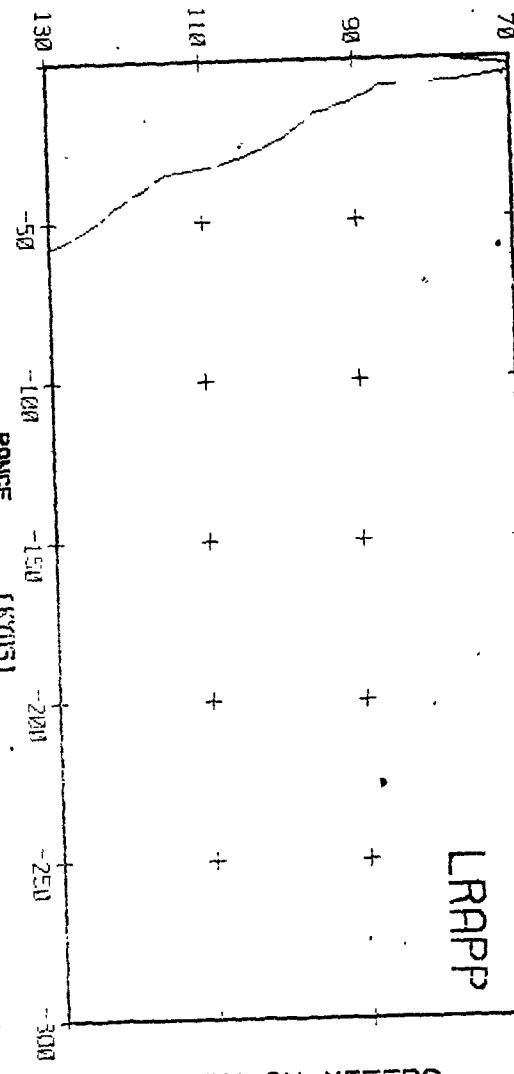
AREA AB SUMMER

S 20 R 1500 F 2000

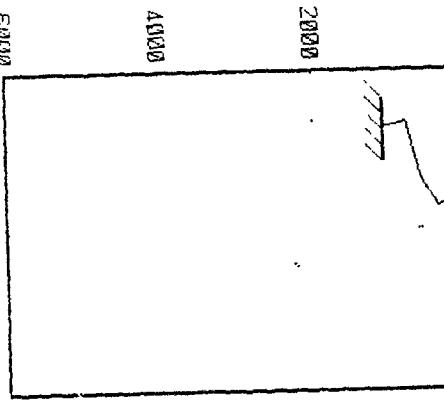
1450 M/S - 1500 1550

LRAPP

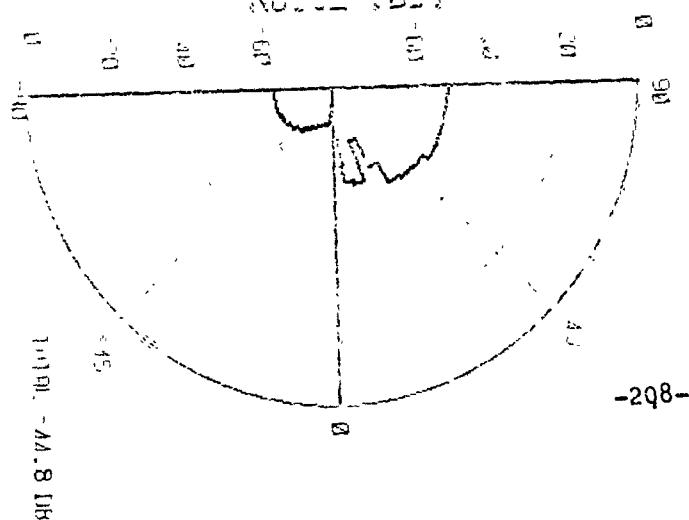
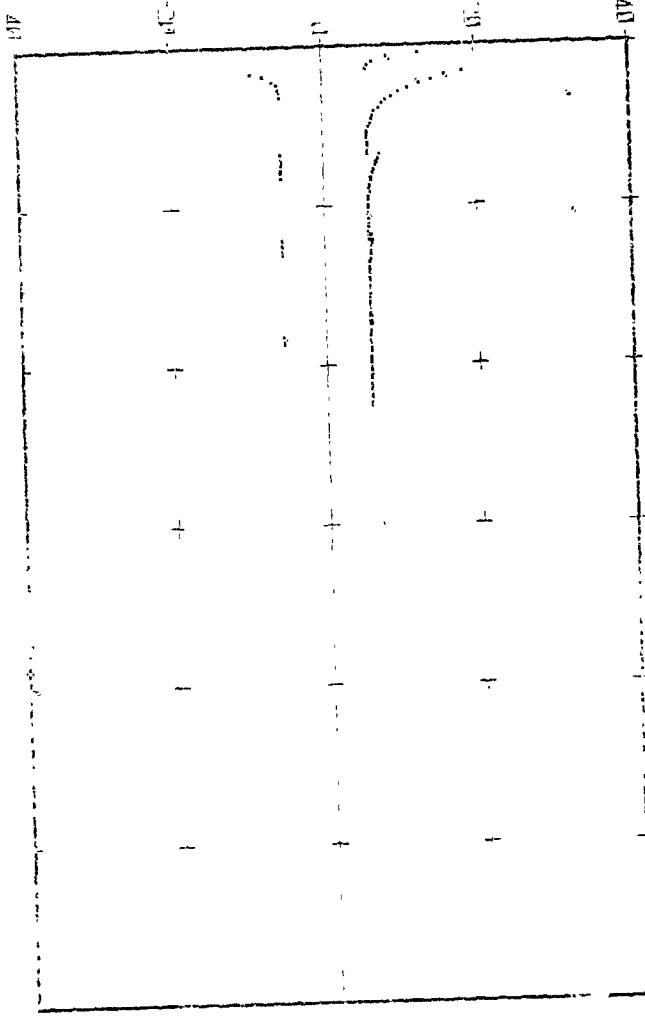
DB LOSS



DEPTH IN METERS



ARRIVAL ANGLE

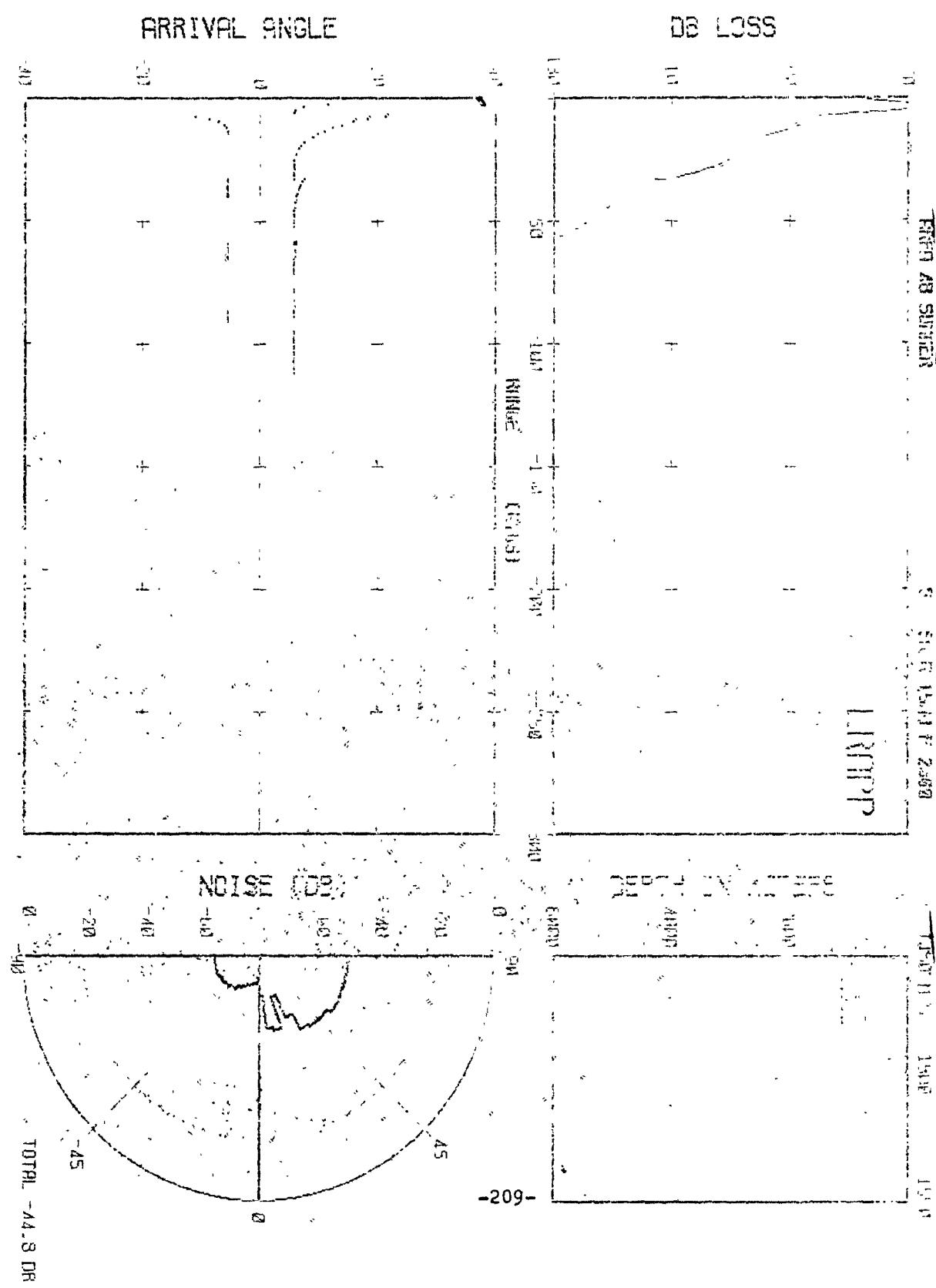


1010. - MM. 8 DB

WITNESSING BY LIA

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11



## ARRIVAL ANGLE

## DB LOSS

AFTER AS SUMMER

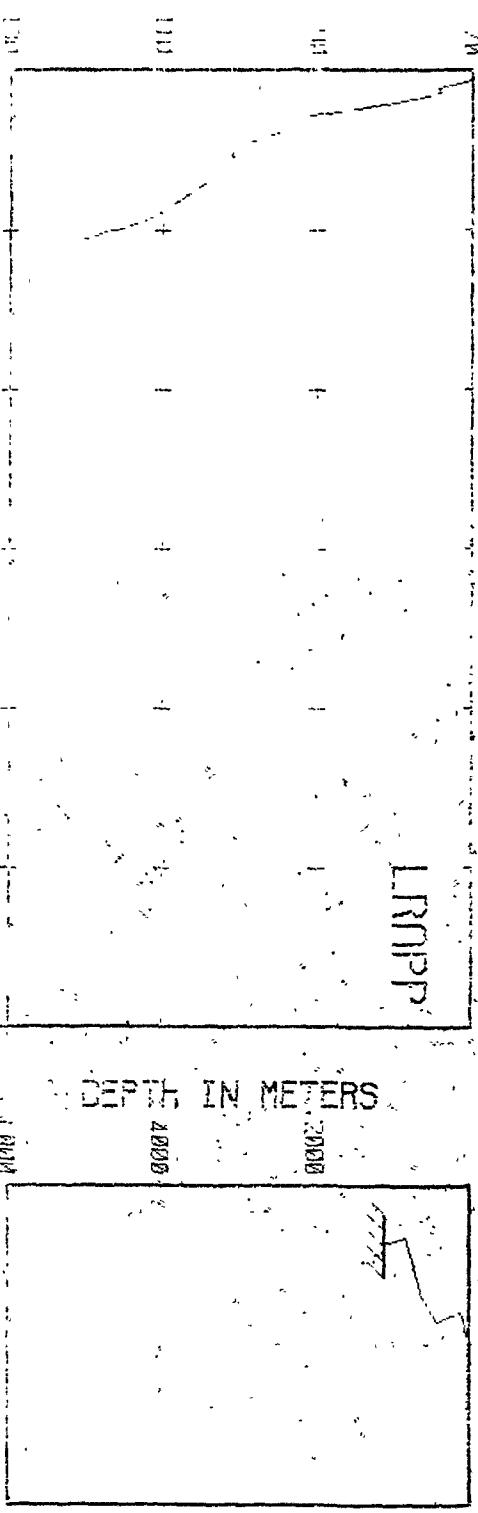
S 263 N 15249 E 2300

1450' H/S 1500

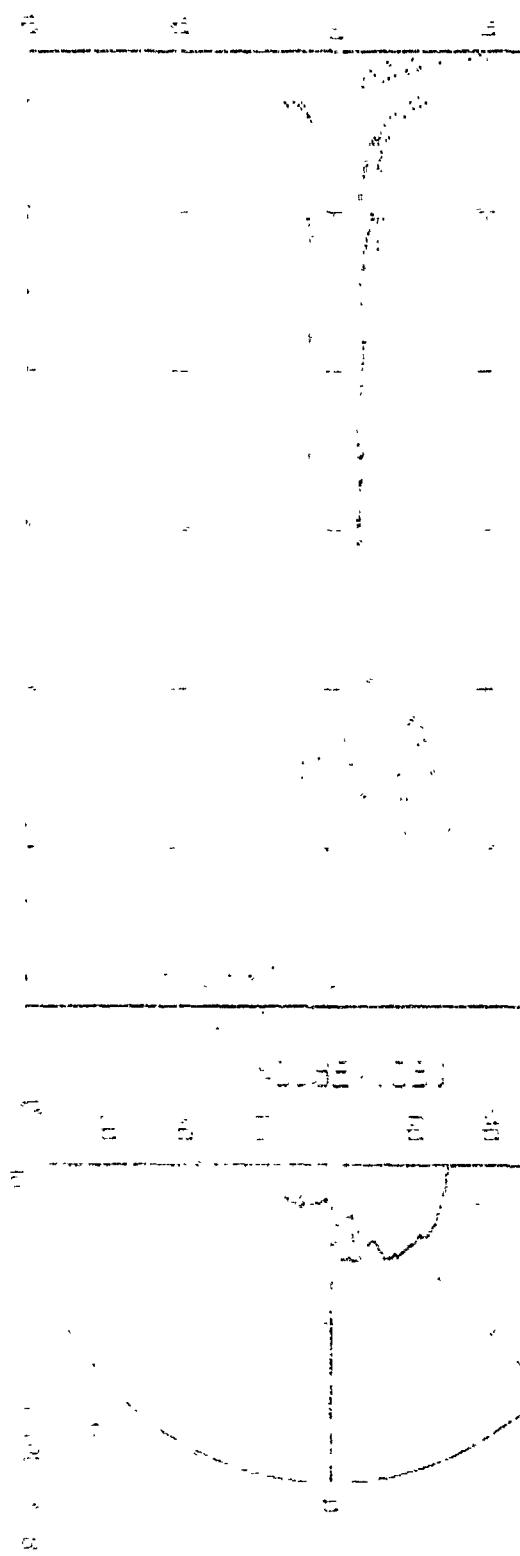
1550

LFBP

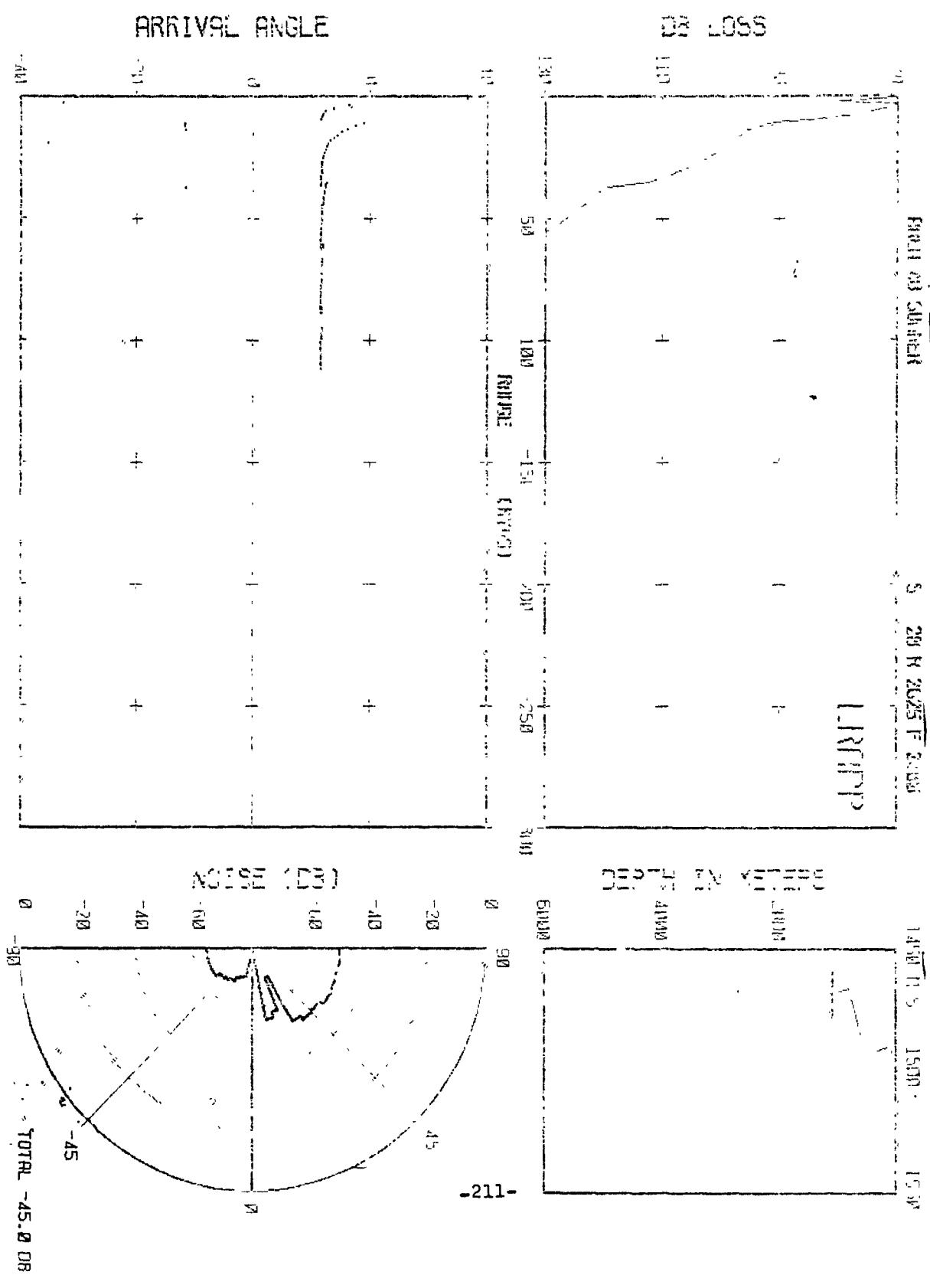
IN METERS



-210-



3



70

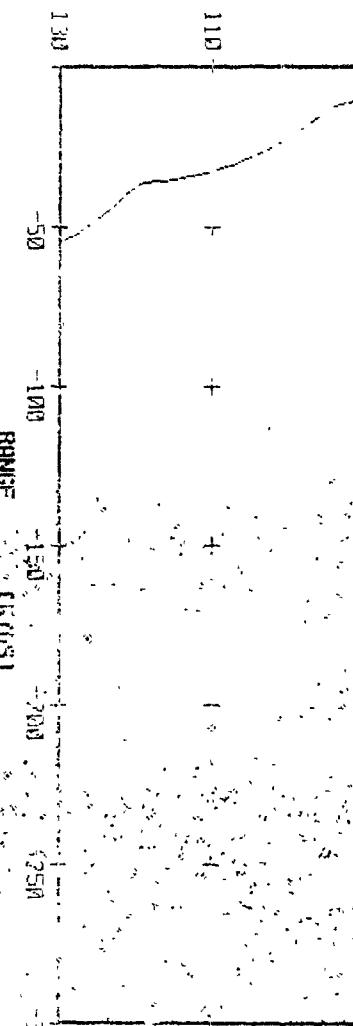
ARR 4B SUMMER

S - 54 R 2625 F 2008

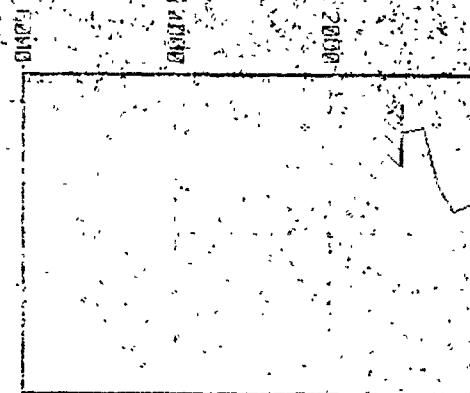
1454 M/S 1500 1550

LRapp

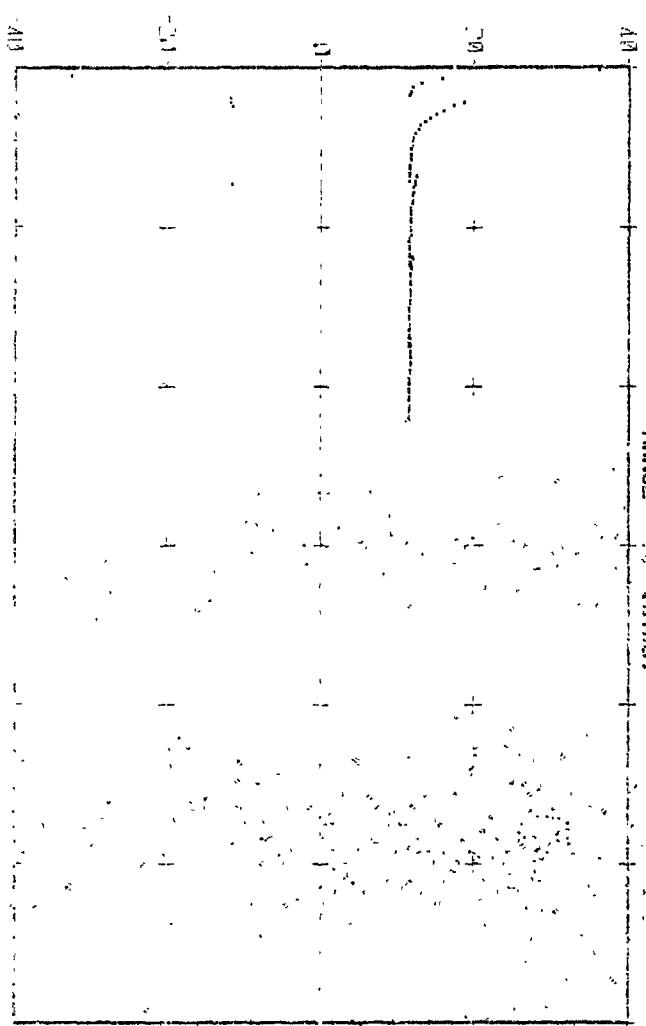
## DB LOSS



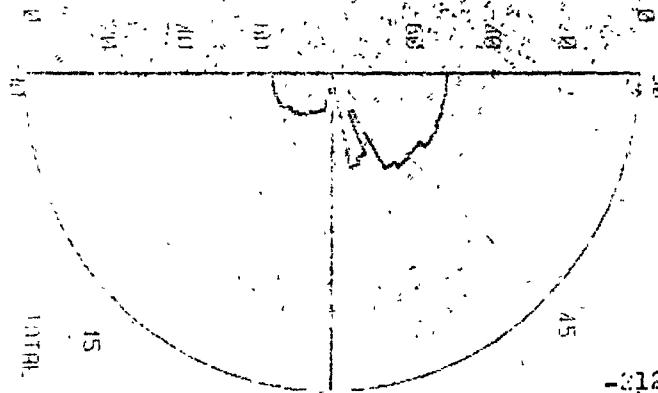
## DEPTH IN METERS



## ARRIVAL ANGLE



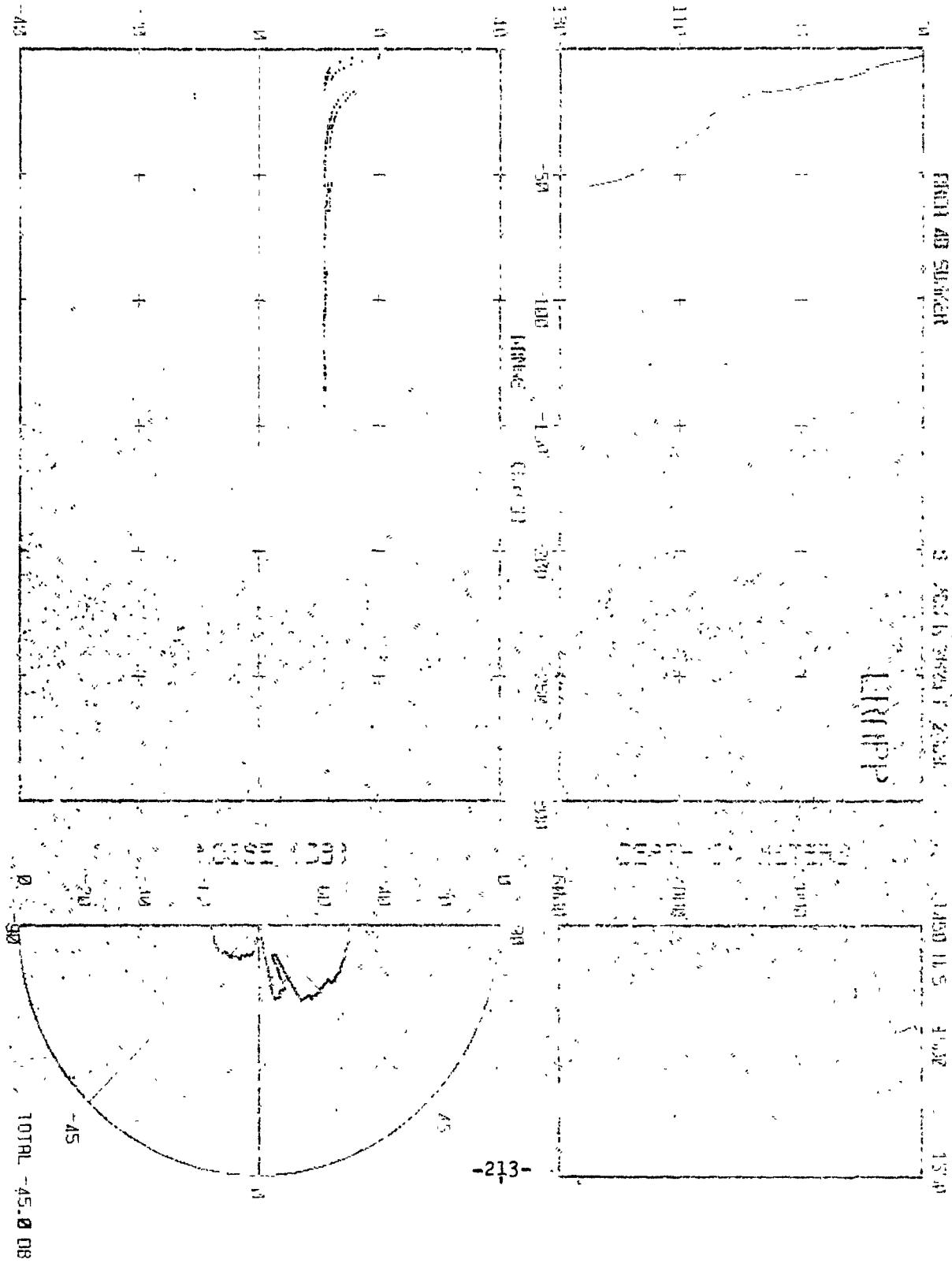
## NOISE (DB)



-312-

## ARRIVAL ANGLE

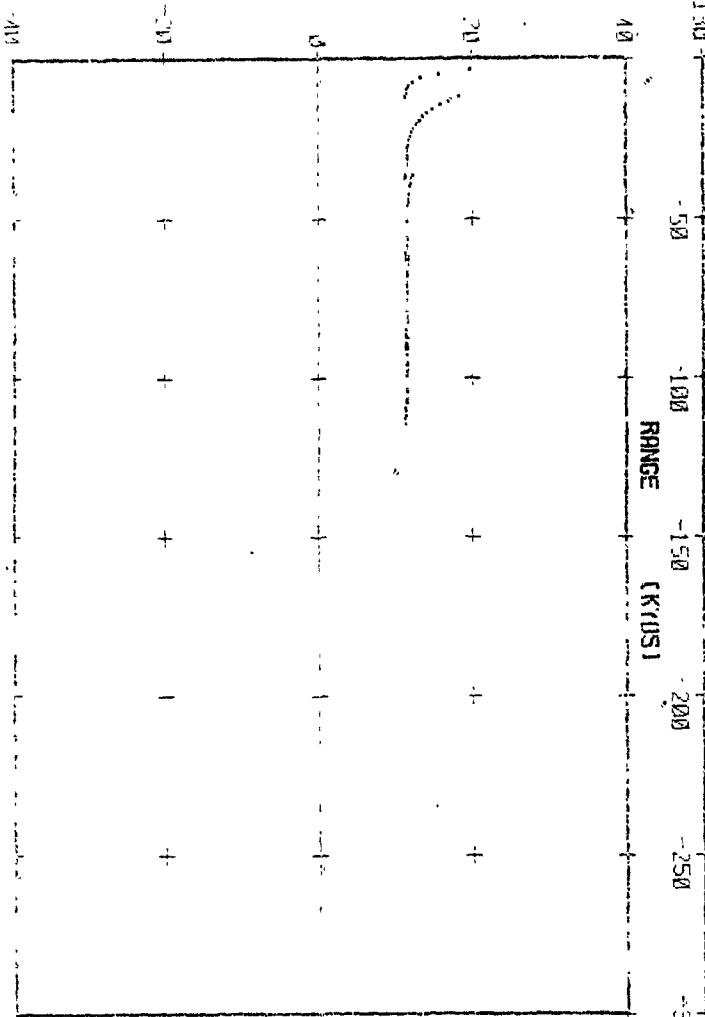
## DB LOSS



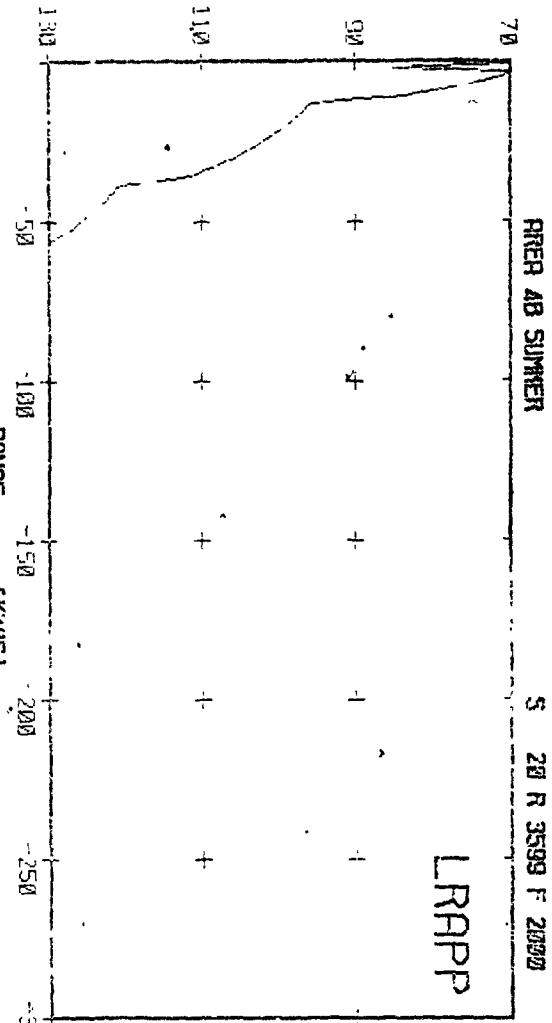
-213-

TOTAL -45.0 08

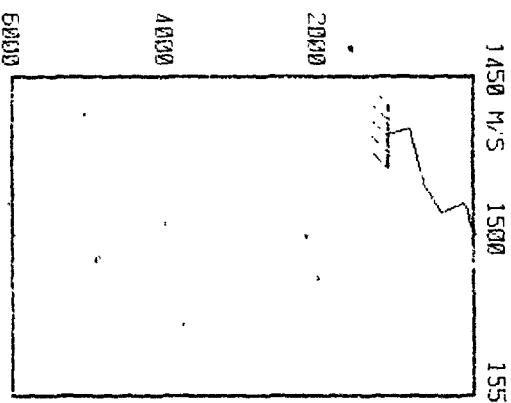
### ARRIVAL ANGLE



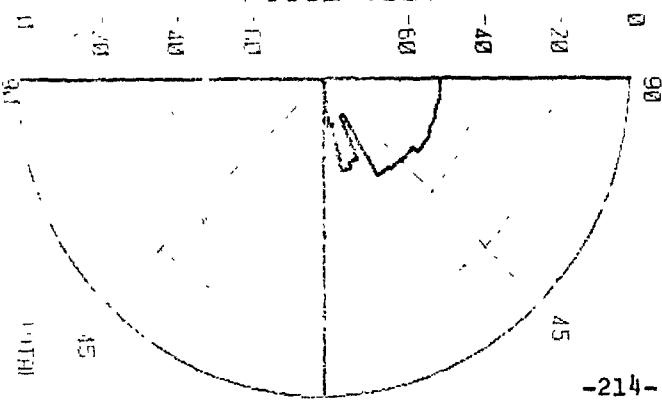
- DB LOSS



**DEPTH IN METERS**



NOISE (dB)



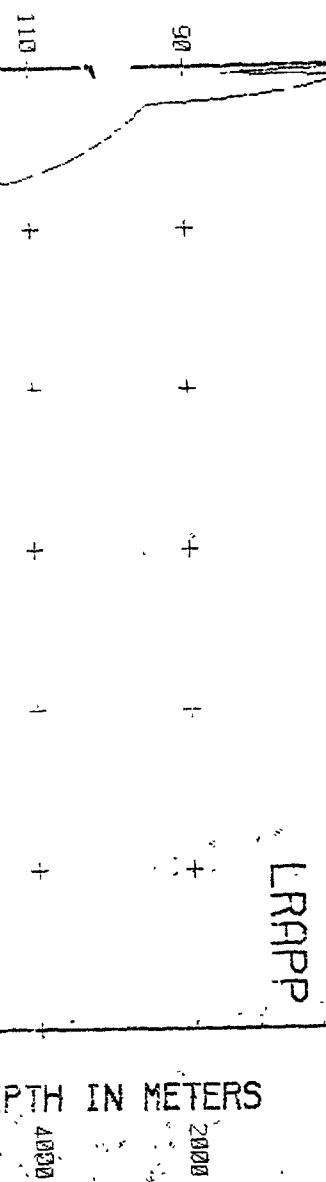
AER 4B SUMMER

S 50 R 3599 F 2000

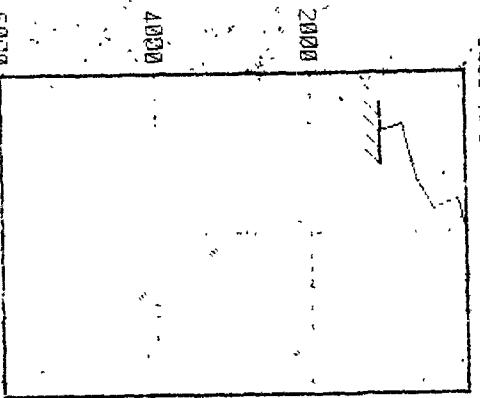
1450 M/S 1500 1550

LRAPP

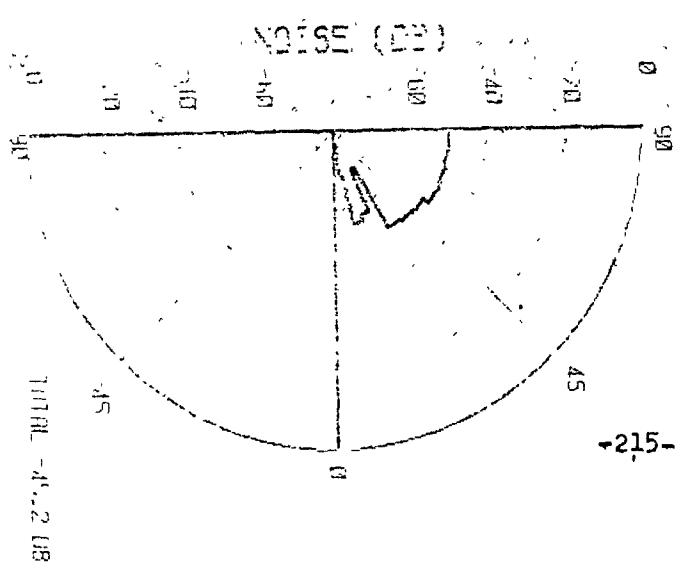
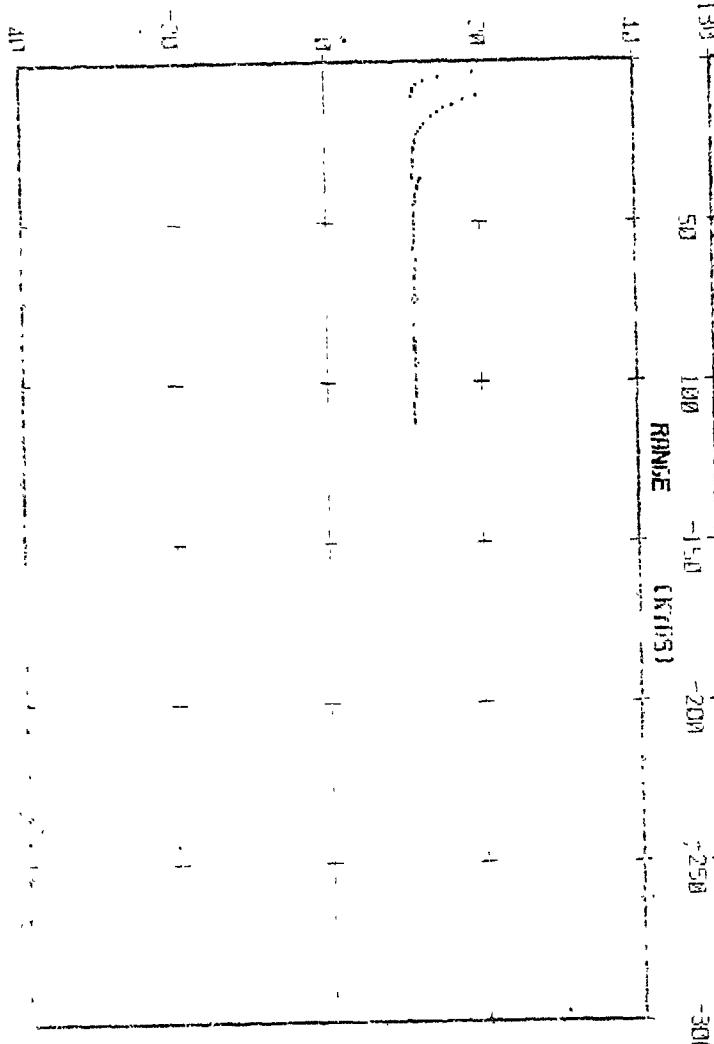
DB LOSS



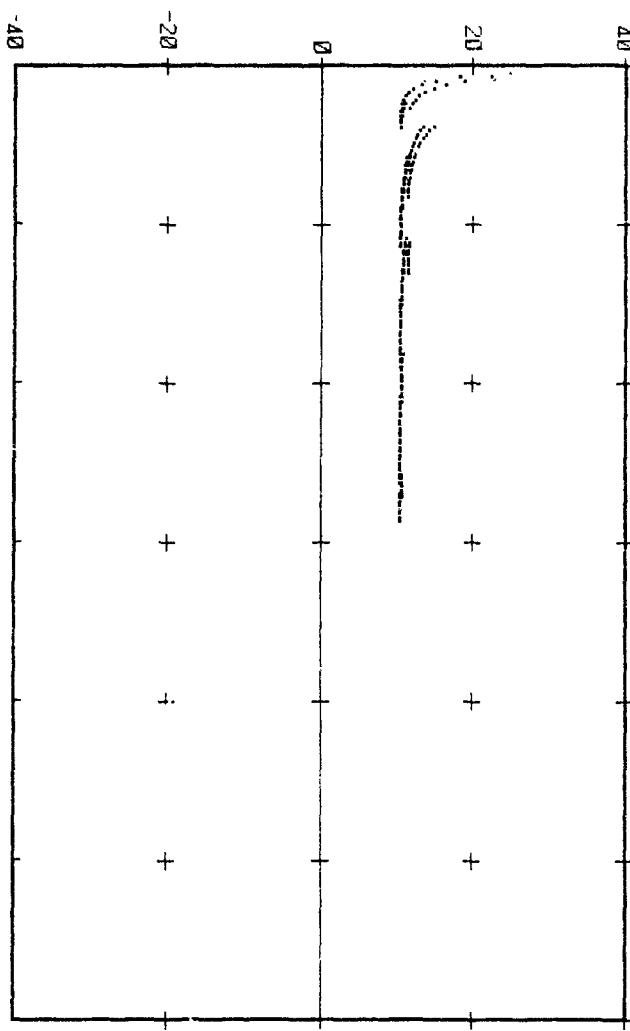
DEPTH IN METERS



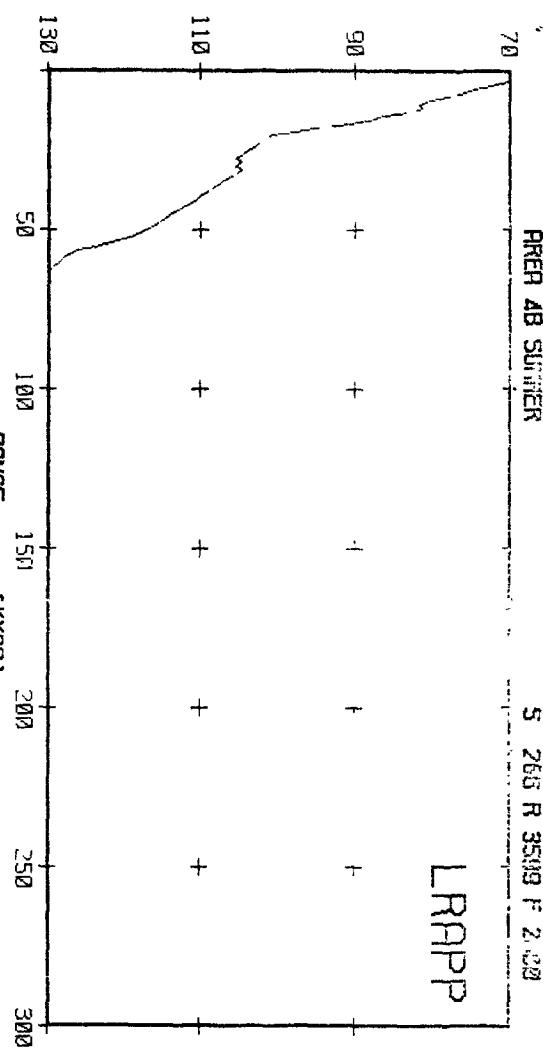
ARRIVAL ANGLE



ARRIVAL ANGLE



DB LOSS

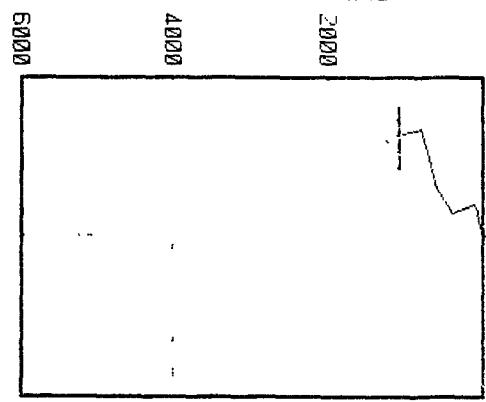


L RAPP

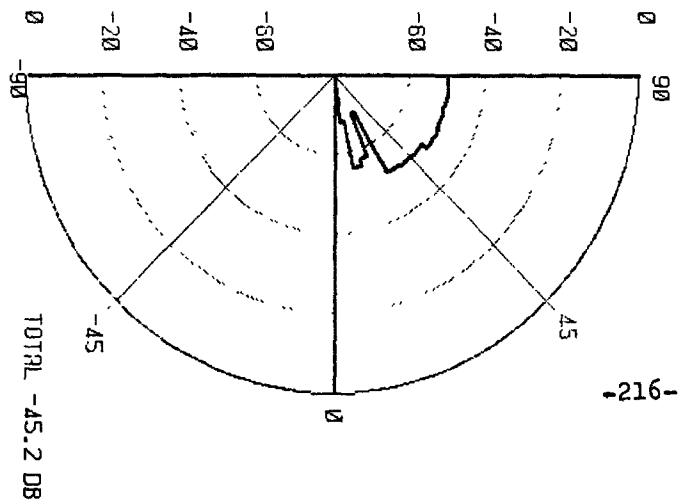
AREA 4B Summer S 263 R 3519 F 2.32

1450 M/S 1500 1550

DEPTH IN METERS



NOISE (DB)



70

AREA AB SUMMER

S 20 R 60 F 2500

1450 1450 1500 1550

LRAPP

DB LOSS

130

50

100

150

200

250

300

40

90

140

190

240

290

340

390

440

-217-

DEPTH IN METERS

2000

4000

6000

8000

10000

12000

14000

16000

18000

20000

22000

24000

26000

28000

30000

32000

34000

36000

38000

40000

42000

44000

46000

48000

50000

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60000

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66000

68000

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76000

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96000

98000

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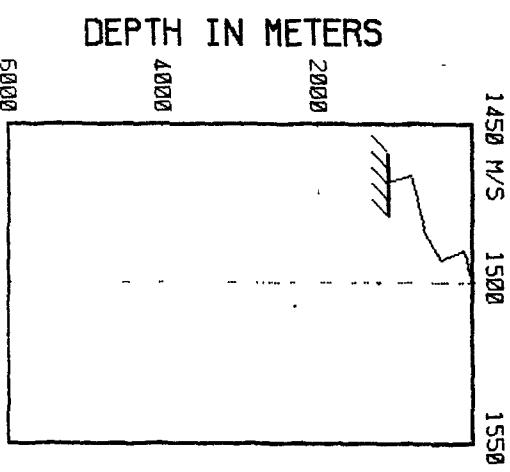
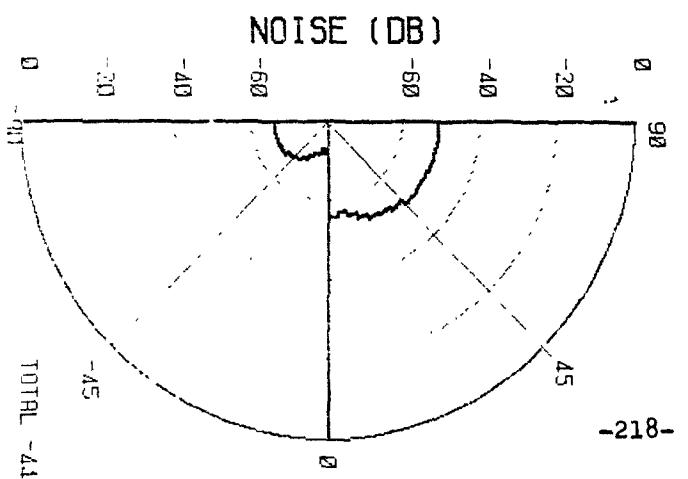
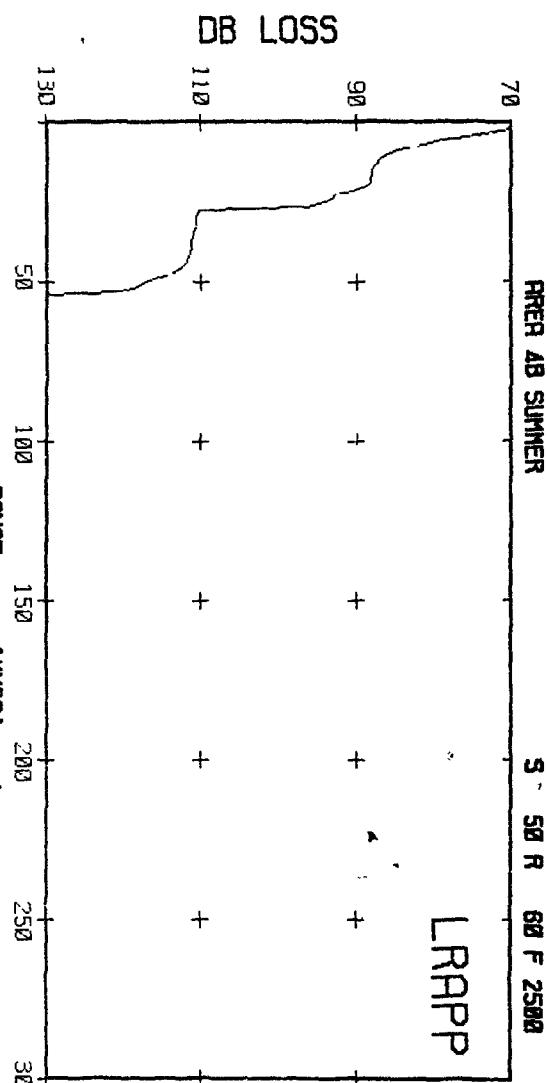
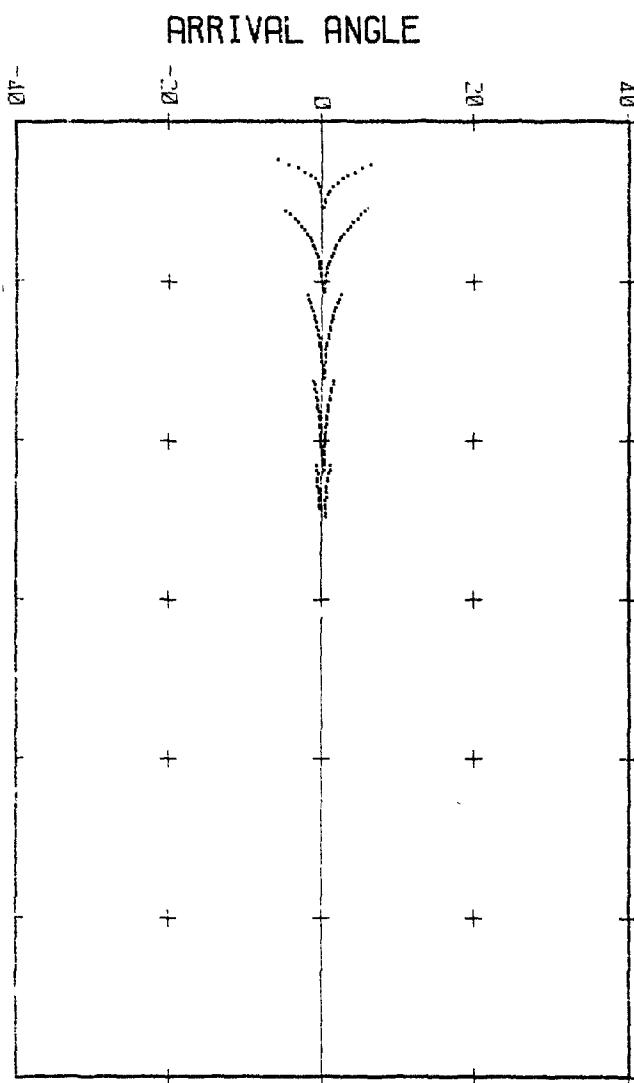
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590000&lt;/



TOTAL -44.3 Pg

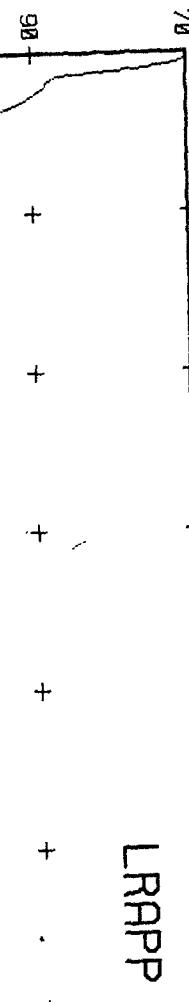
AREA 4B SUMMER

S 266 R 68 F 2500

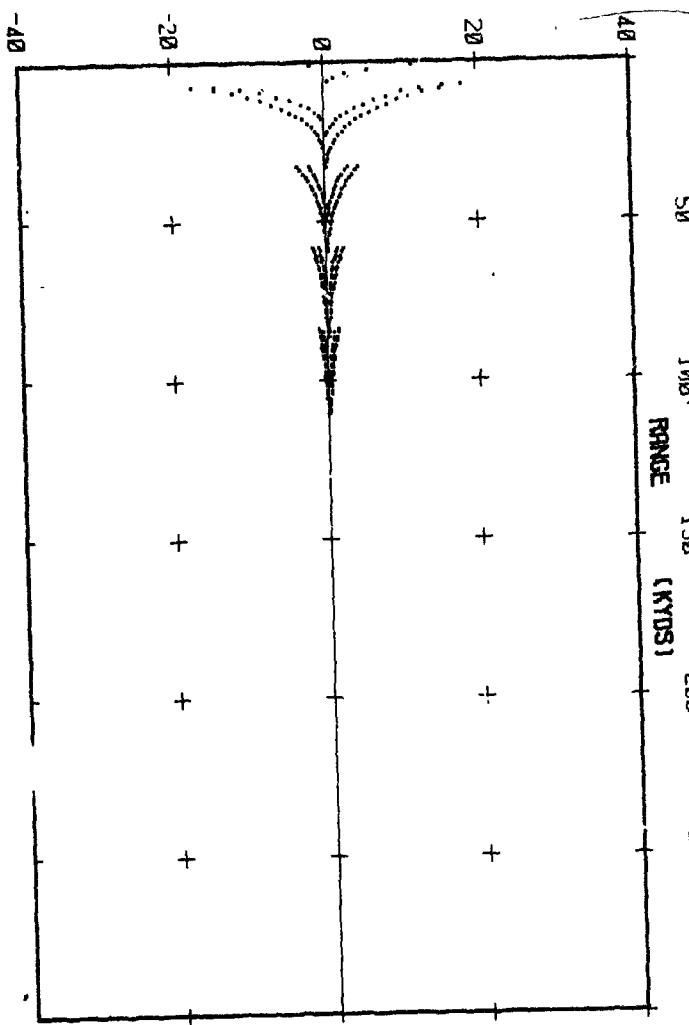
1450 M/S 1500 1550

LRAPP

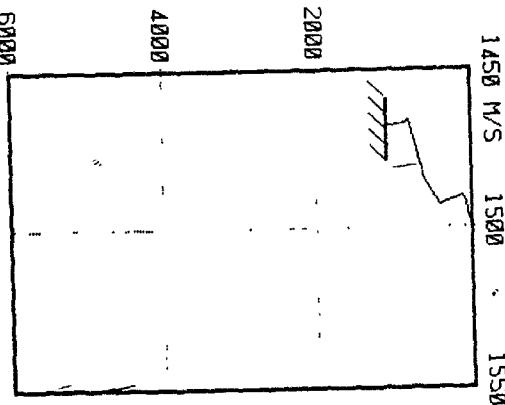
DB LOSS



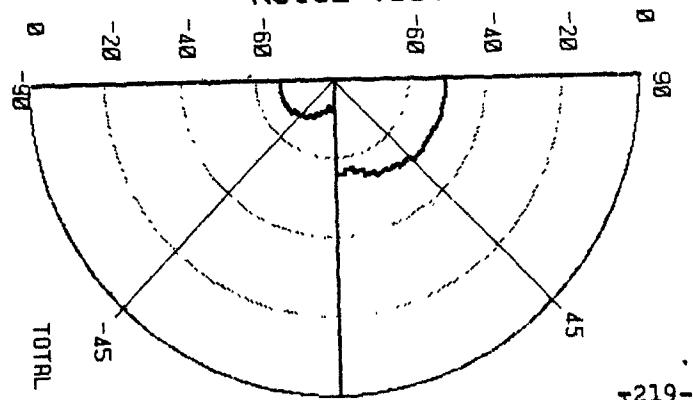
ARRIVAL ANGLE



DEPTH IN METERS



NOISE (DB)



TOTAL -44.9 DB

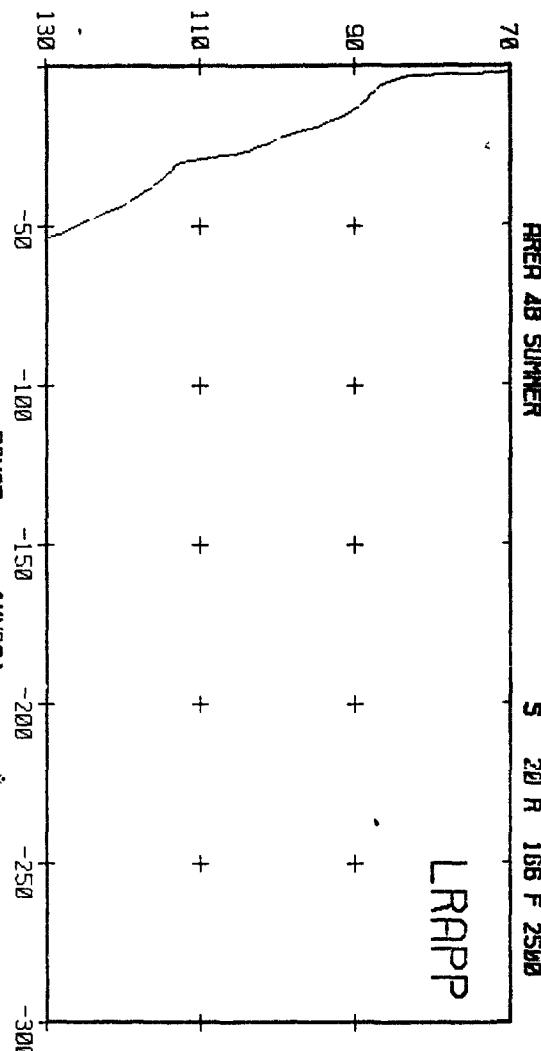
76

ARER 4B SUMMER

S 20 R 166 F 2500

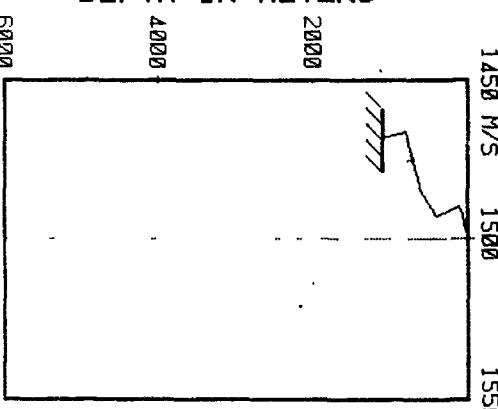
1450 M/S 1500 1550

## DB LOSS

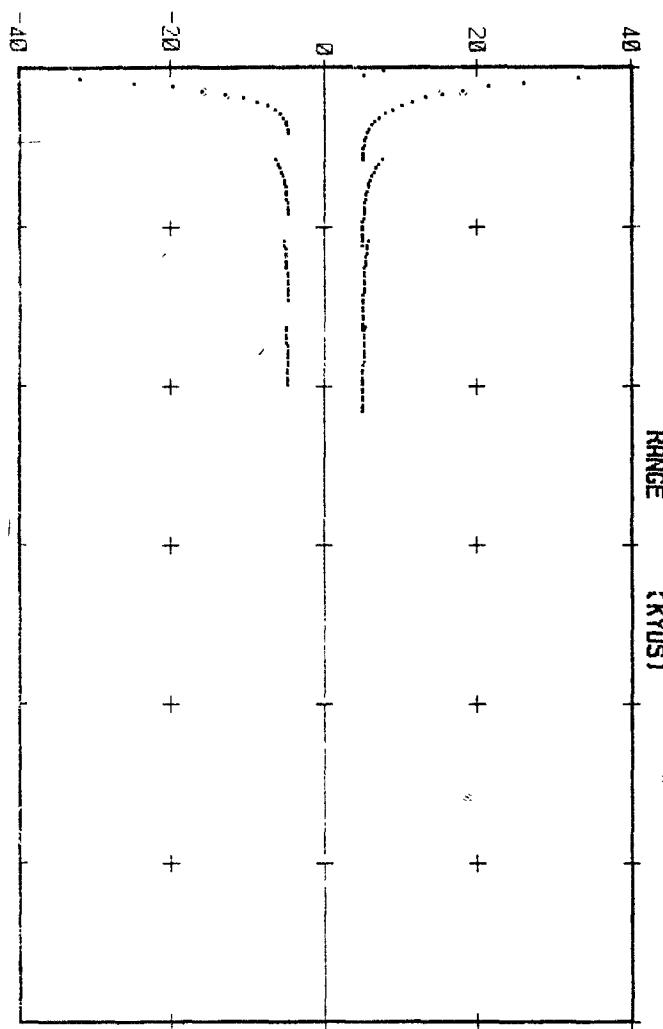


LRAPP

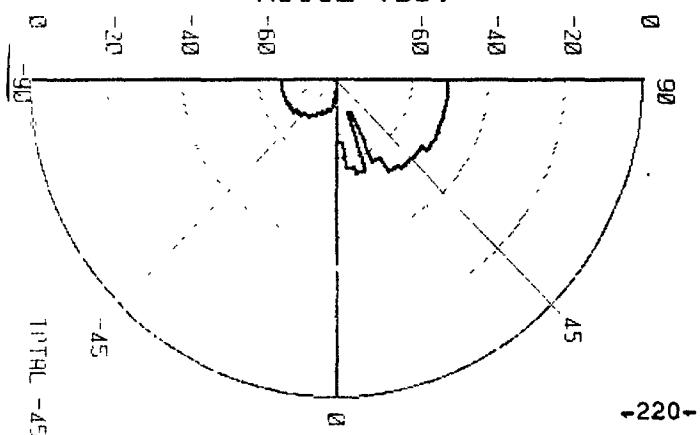
## DEPTH IN METERS



## ARRIVAL ANGLE



## NOISE (DB)



-220-

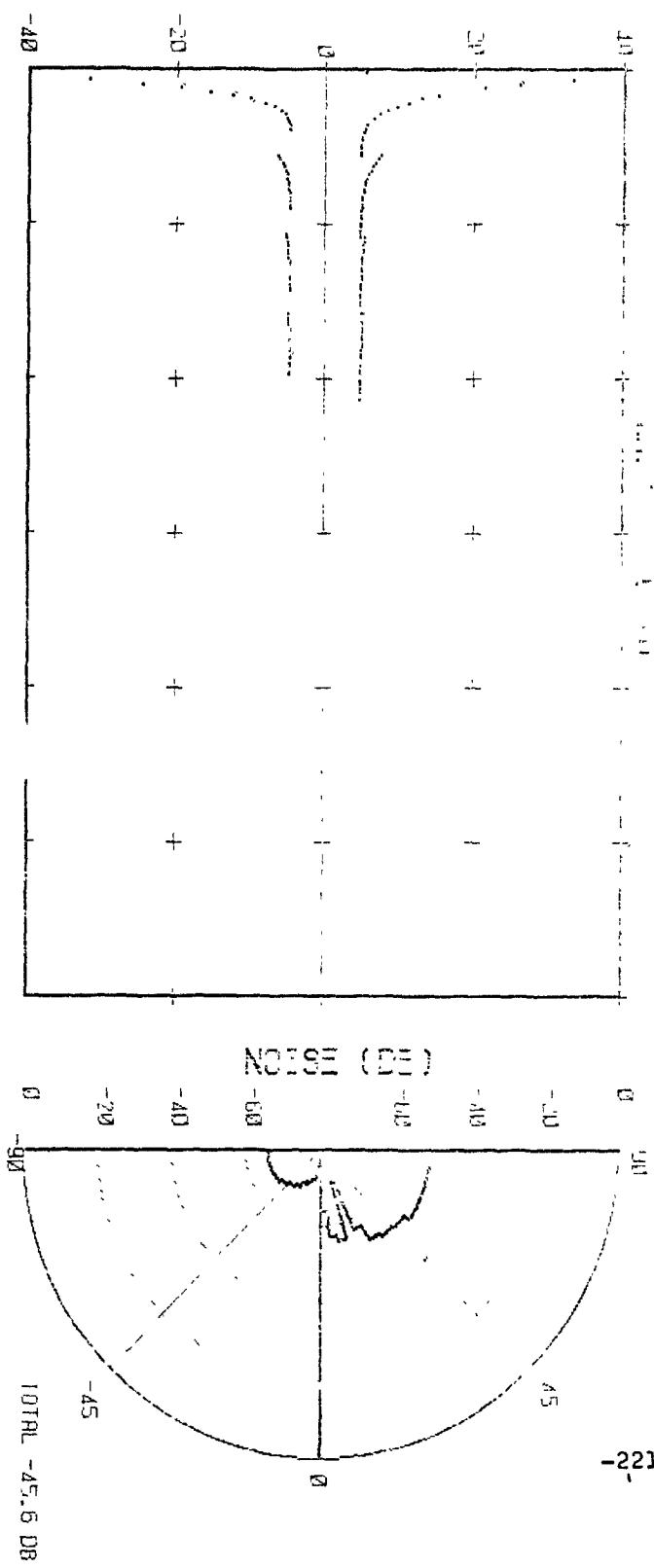
TOTAL -45.6 DB

PAGE 1 OF 4

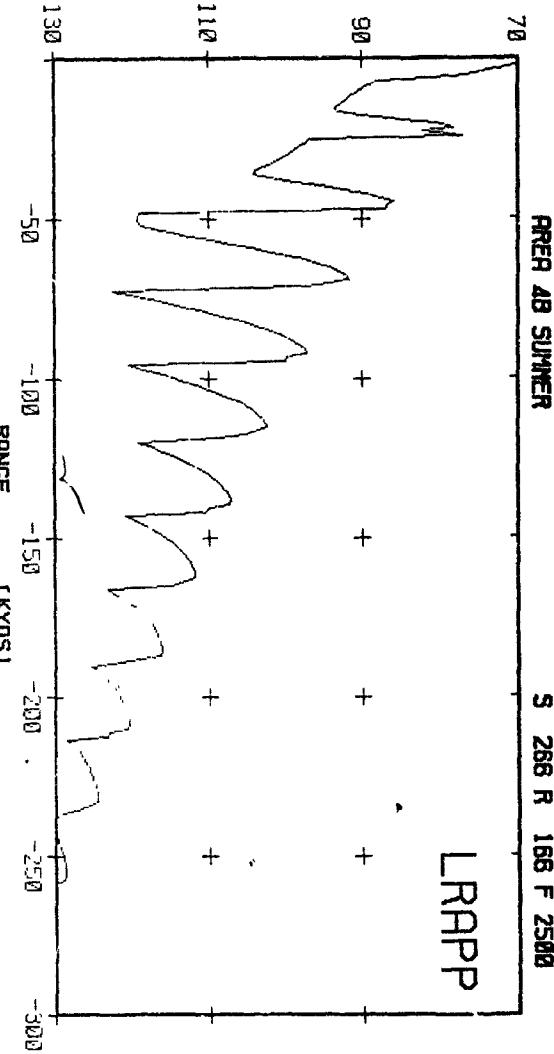
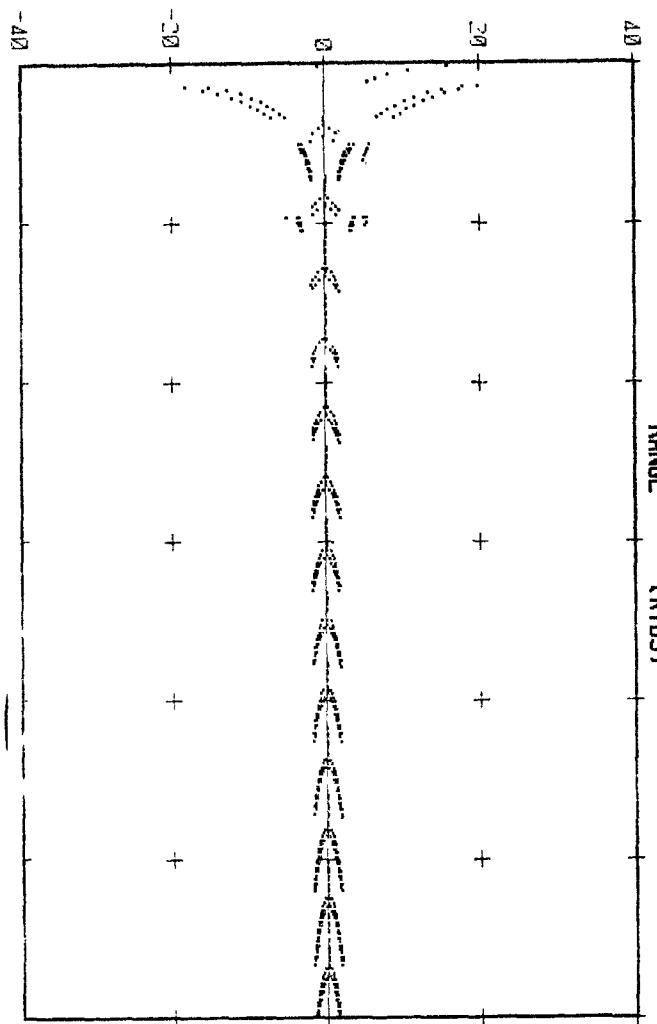
TIME 05:15 AM 15 SEP

L1000

ARRIVAL ANGLE



-221-

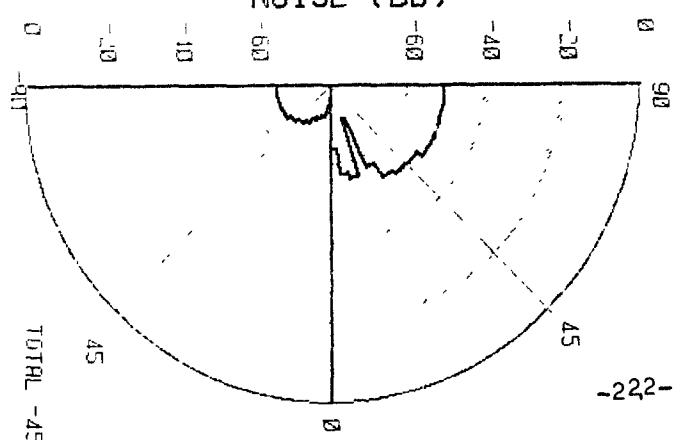


AREA 4B SUMMER

S 268 R 168 F 2500

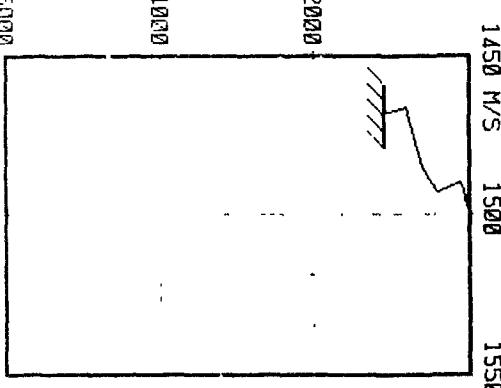
LRAPP

**DEPTH IN METERS**



TOTAL -45.6 DB

TAL -45.6 dB



1450 M/S 1500 1550

-222-

70

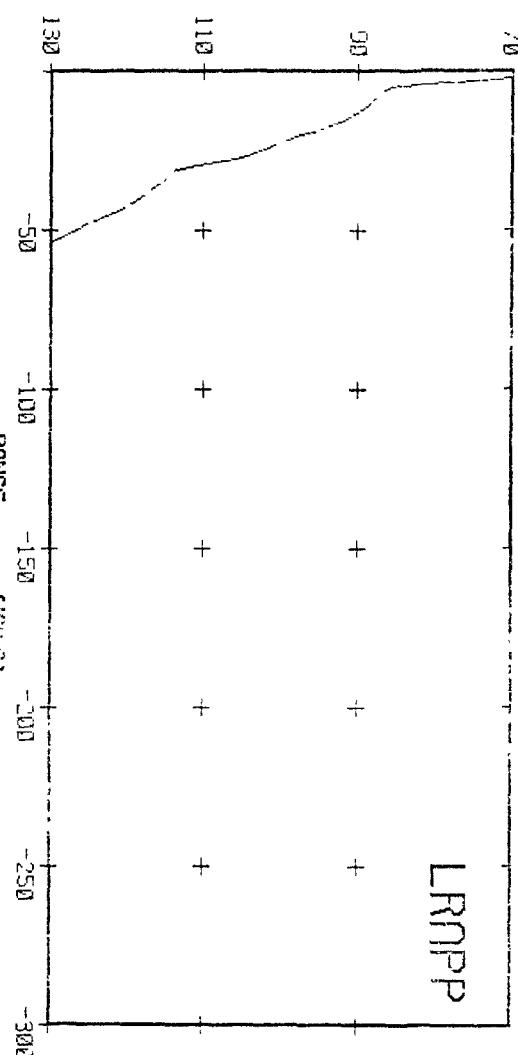
REFER AB SUMMER

S 29 R 303 F 2564

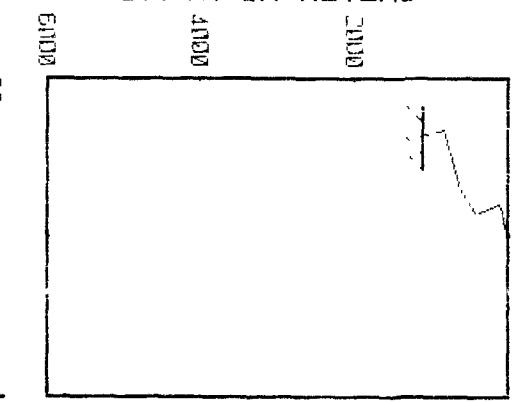
1450 M.S. 1500 1550

LRNPP

## DB LOSS

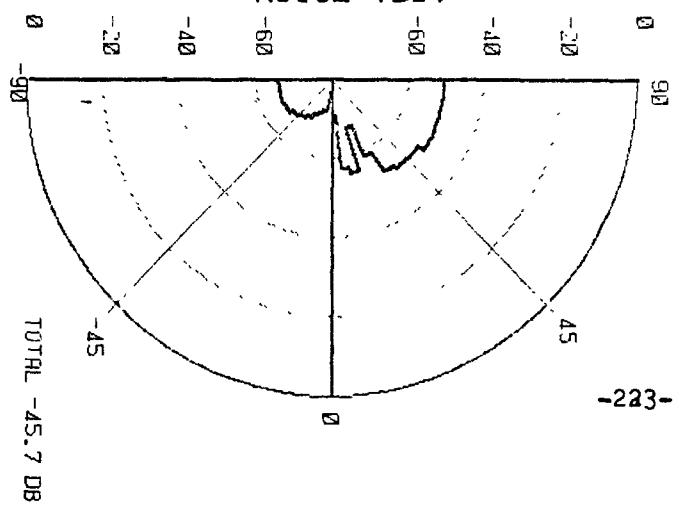
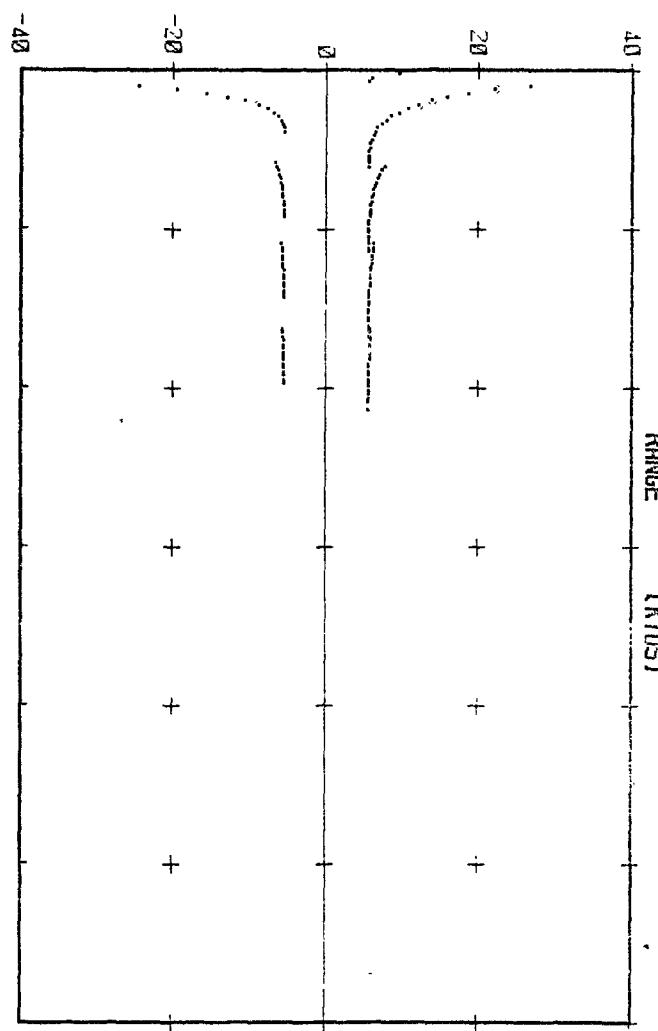


## DEPTH IN METERS



## NOISE (DB)

## ARRIVAL ANGLE



-223-

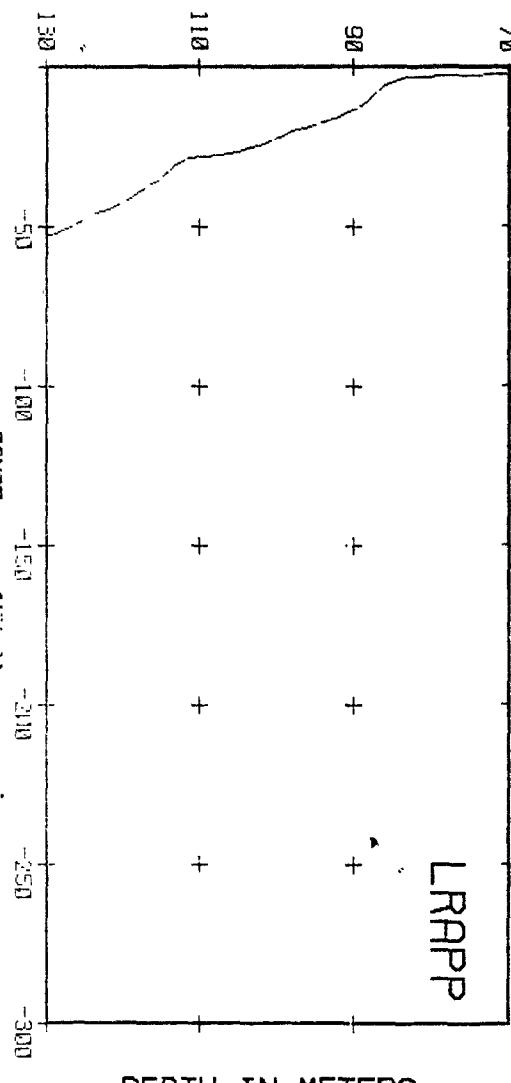
TOTAL -45.7 DB

ARRER 4B SUMMER

S 50°R 380 F 2500

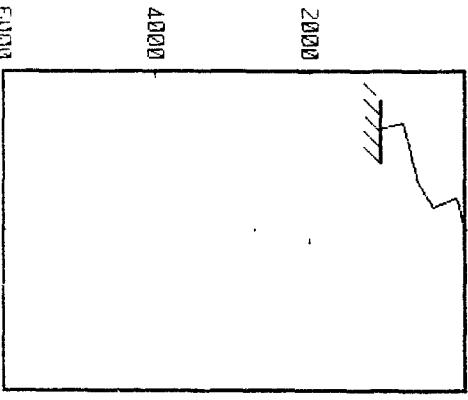
1450 M/S 1500 1550

### DB LOSS

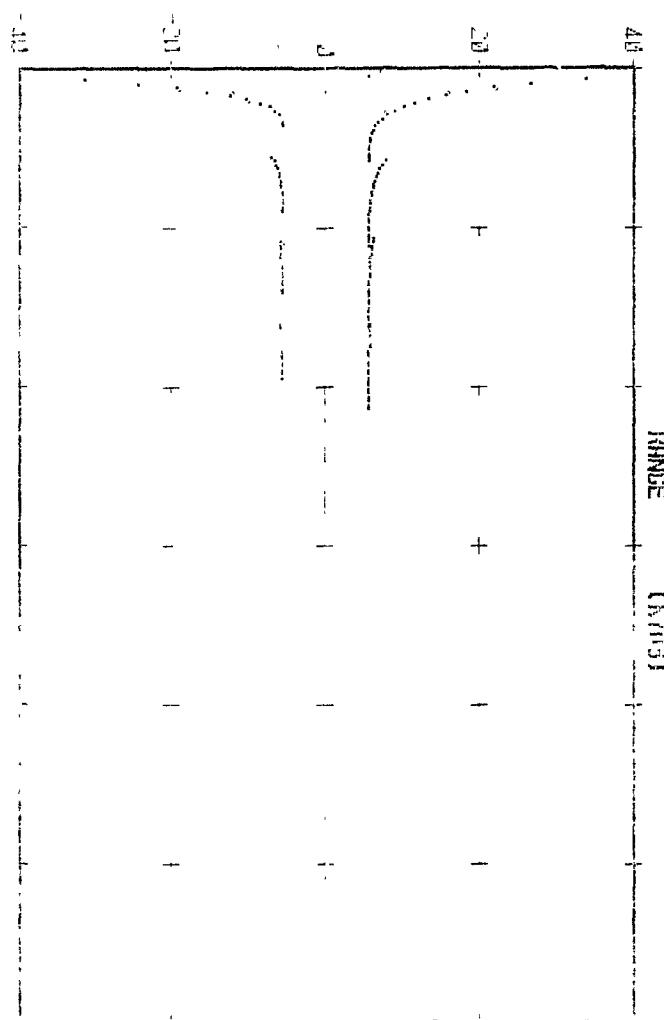


LRAAPP

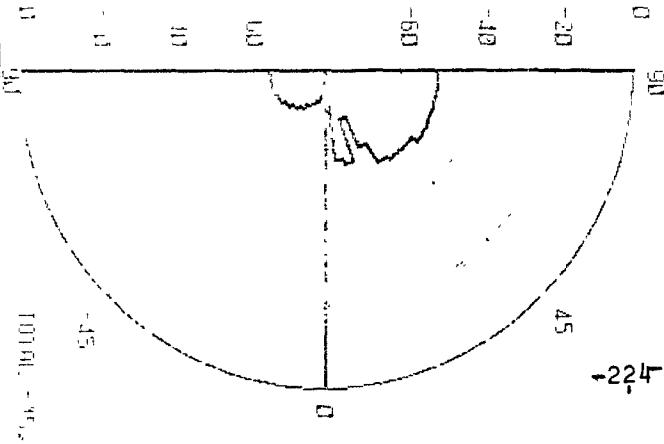
### DEPTH IN METERS



### ARRIVAL ANGLE

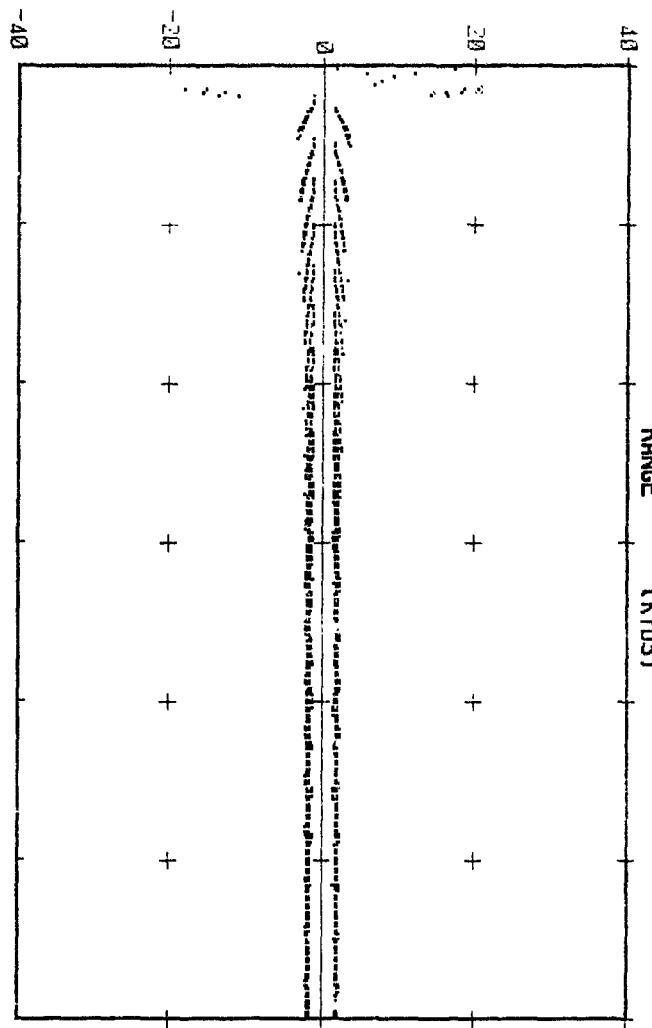


### NOISE (DB)

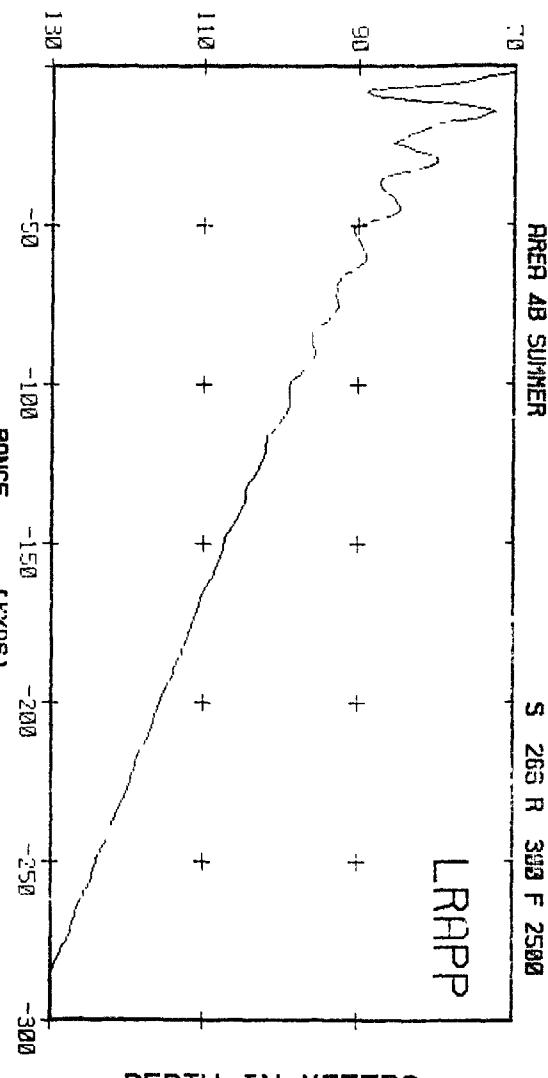


1000 - 45, 27 dB

## ARRIVAL ANGLE



## DB LOSS



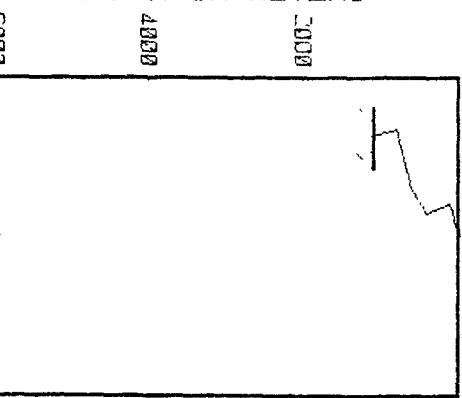
LRHAPP

AREA 4B SUMMER

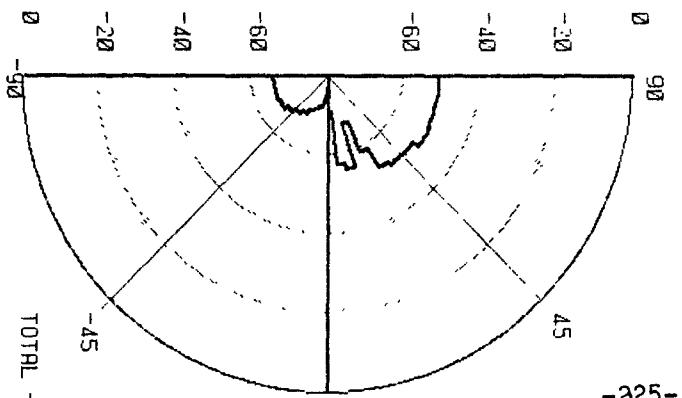
S 265 R 343 F 2500

1450 M/S 1500 1550

## DEPTH IN METERS



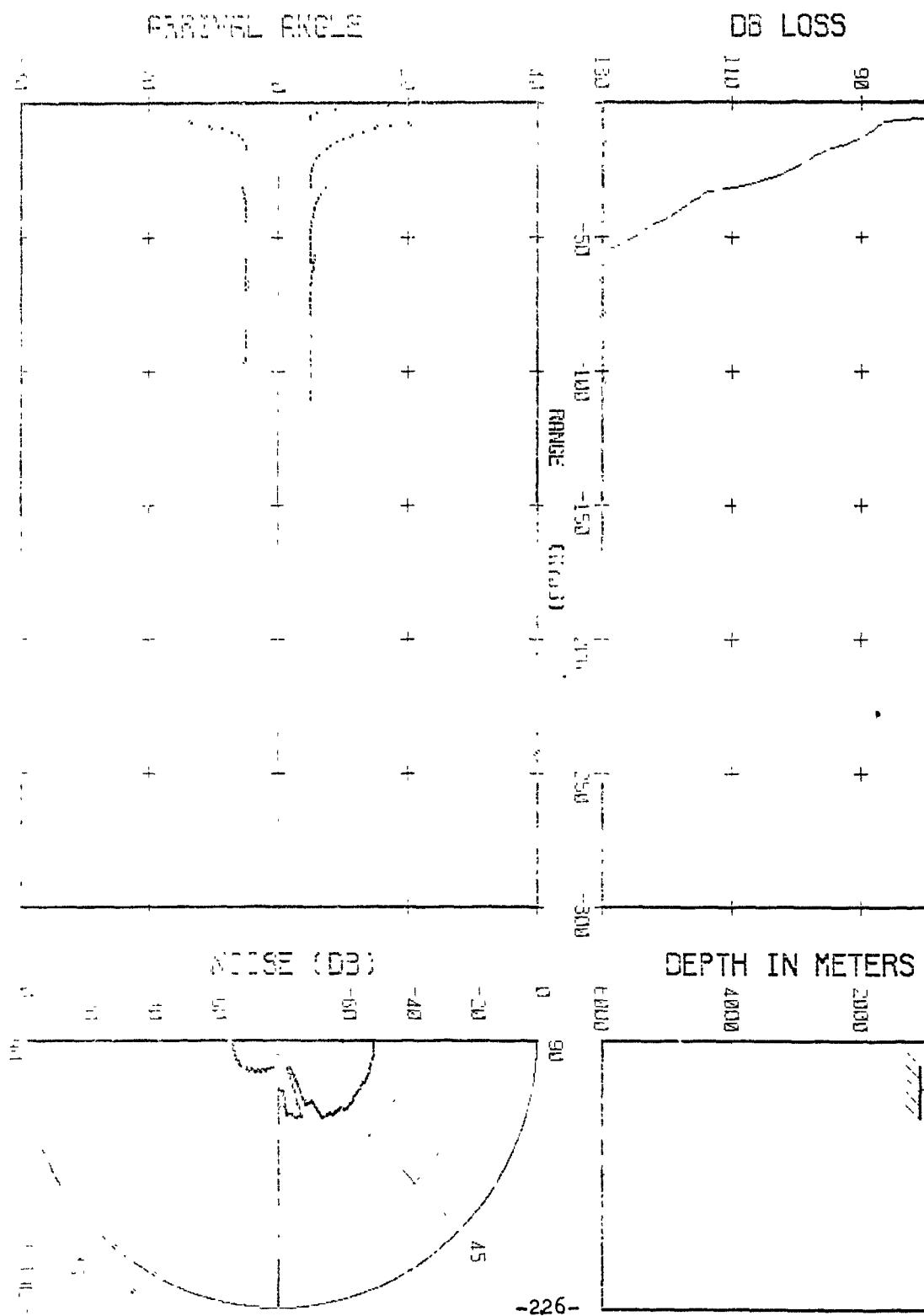
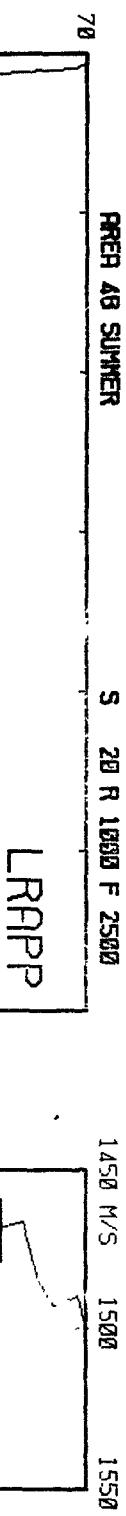
## NOISE (DB)



TOTAL -45.7 DB

-225-

114



70

FIGURE 5.3 "dotted"

S

LRAPP

1450

H.S.

1500

1550

## DB LOSS

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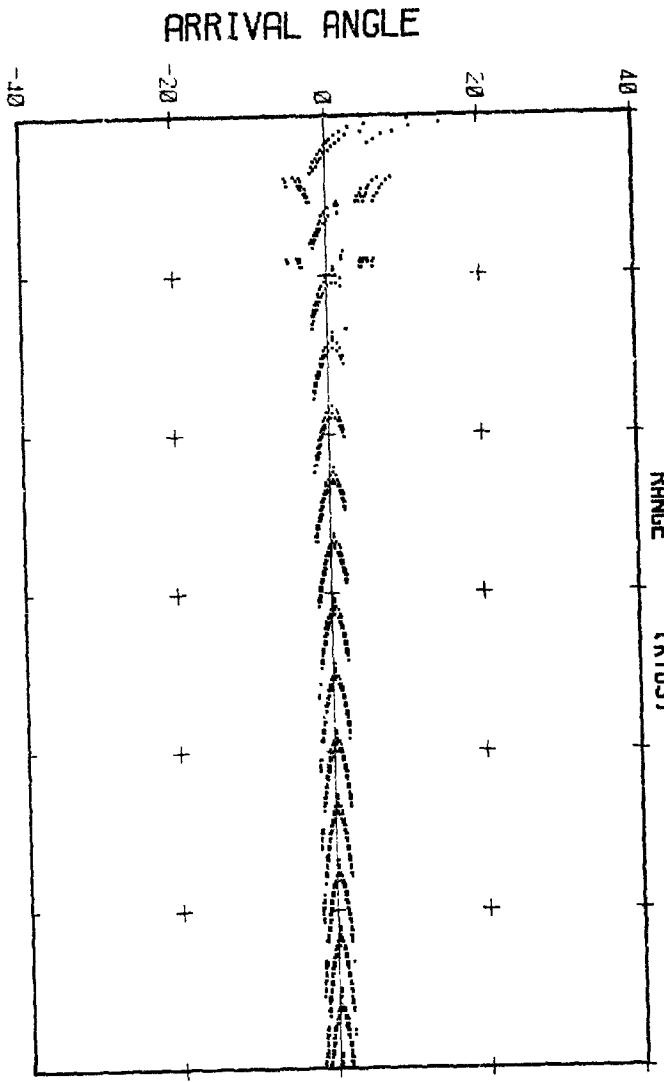
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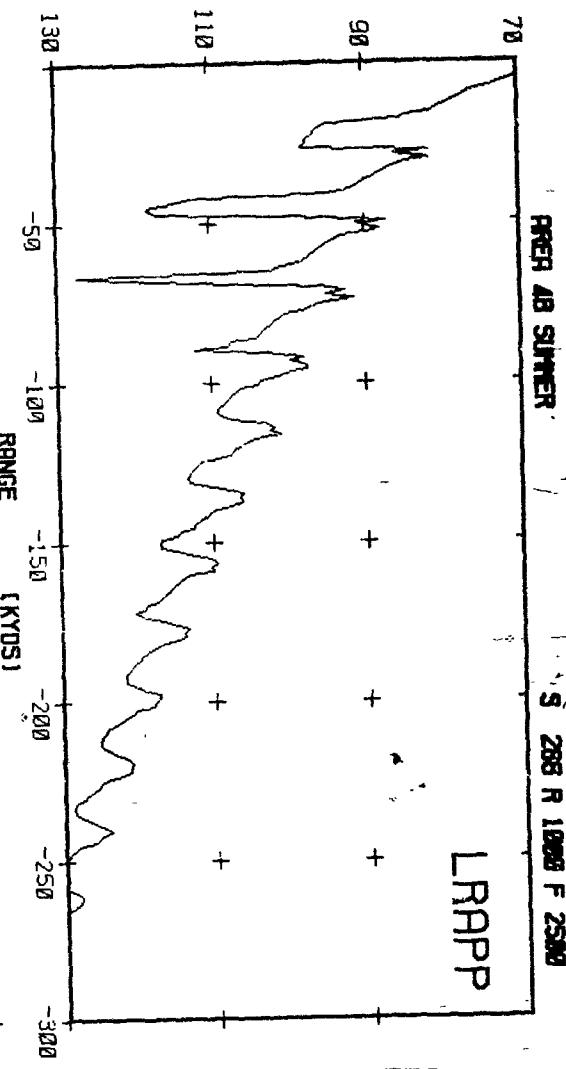
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ARRIVAL ANGLE

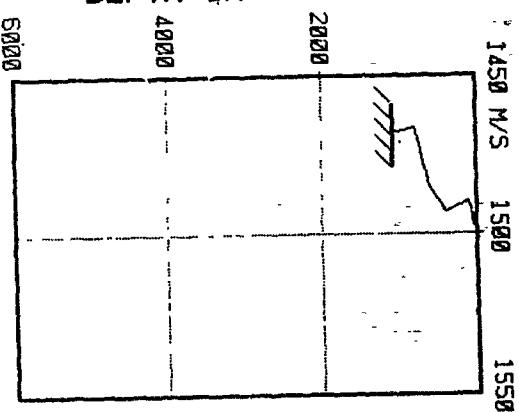


DB LOSS

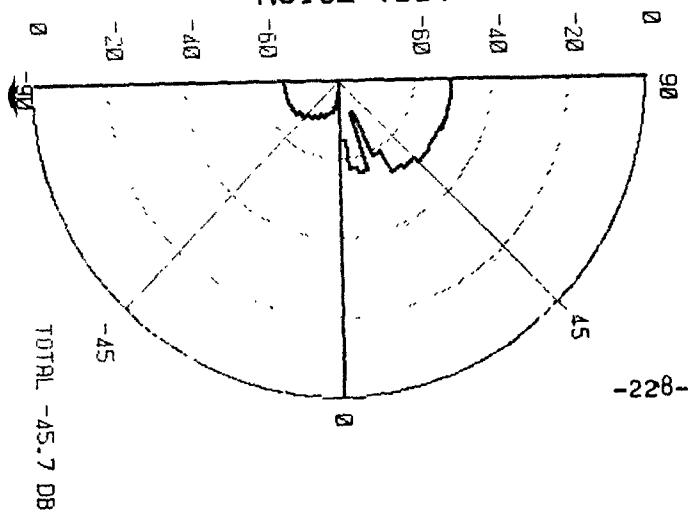


L RAPP

DEPTH IN METERS



NOISE (DB)



TOTAL -45.7 DB

GR. A AB SKJELVÆR

148-15 1498 1500

155A

DB LC65

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5

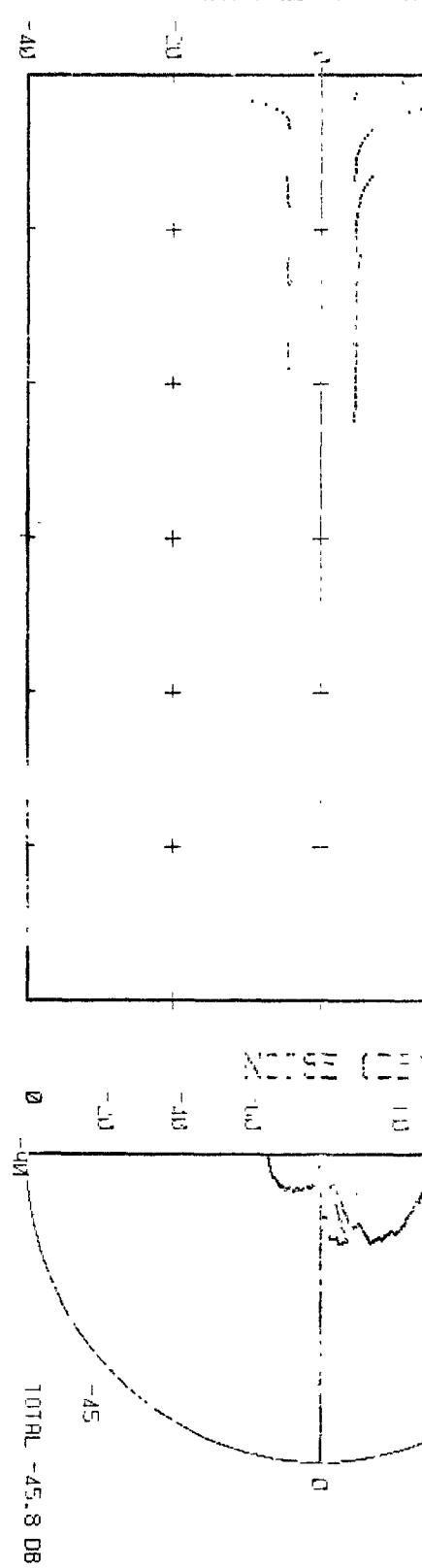
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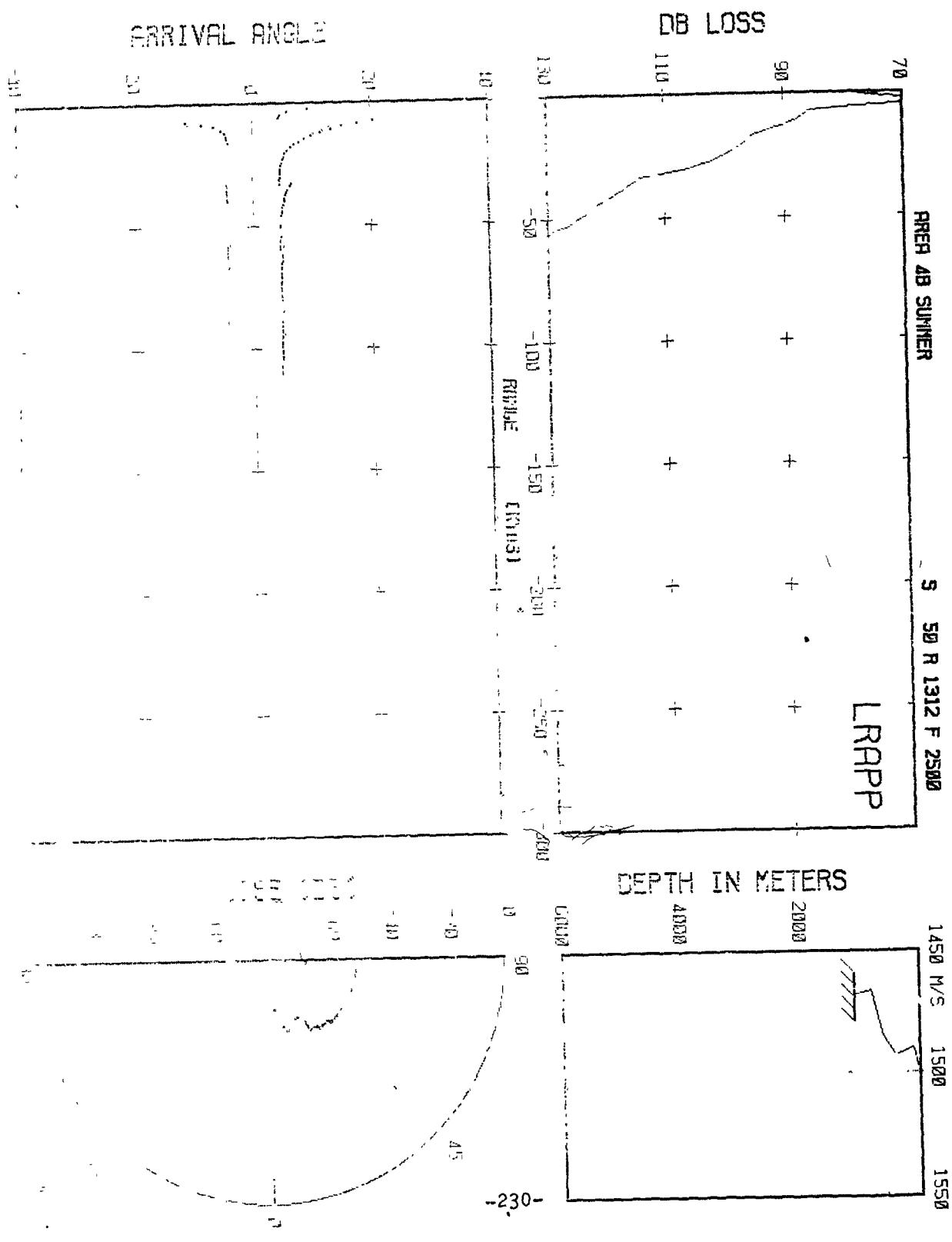
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ARER AB SUMMER

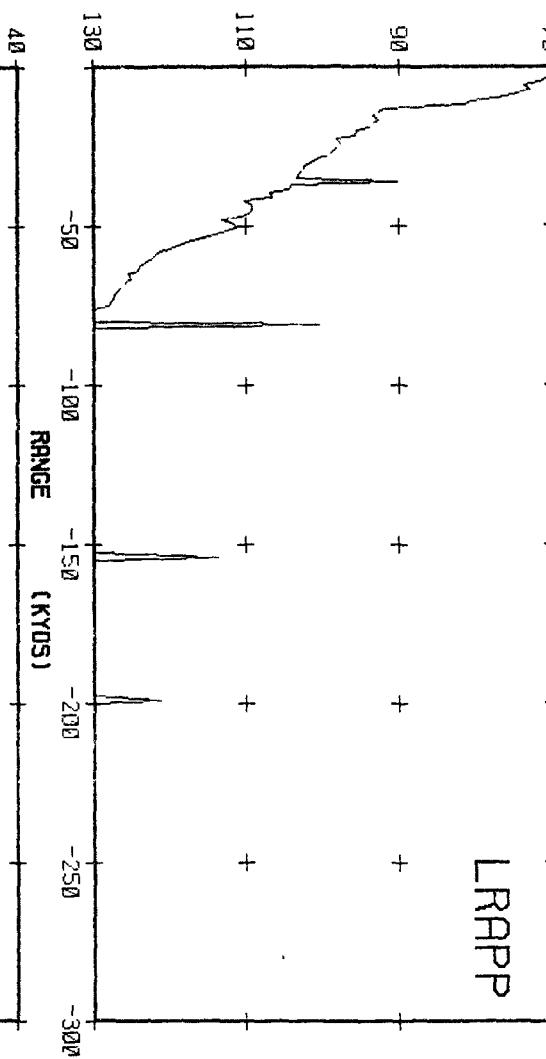
S 268 R 1312 F 2500

1450 M/S 1500 1550

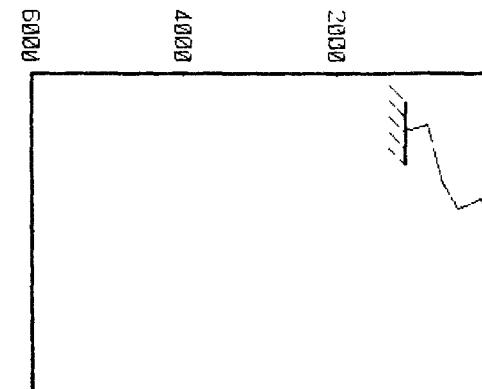
70

LRAPP

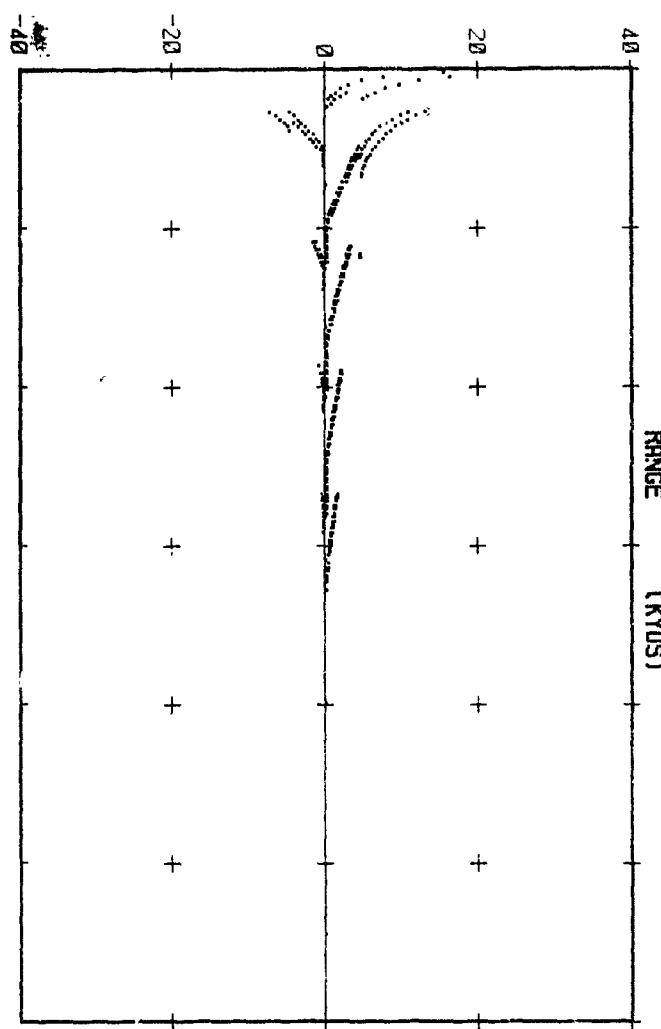
DB LOSS



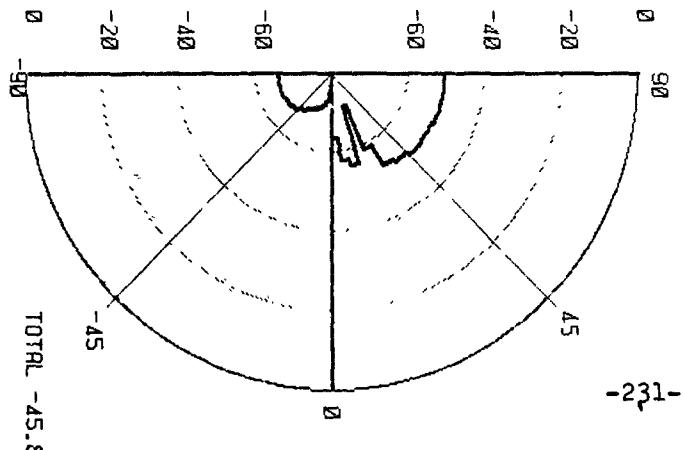
DEPTH IN METERS



ARRIVAL ANGLE



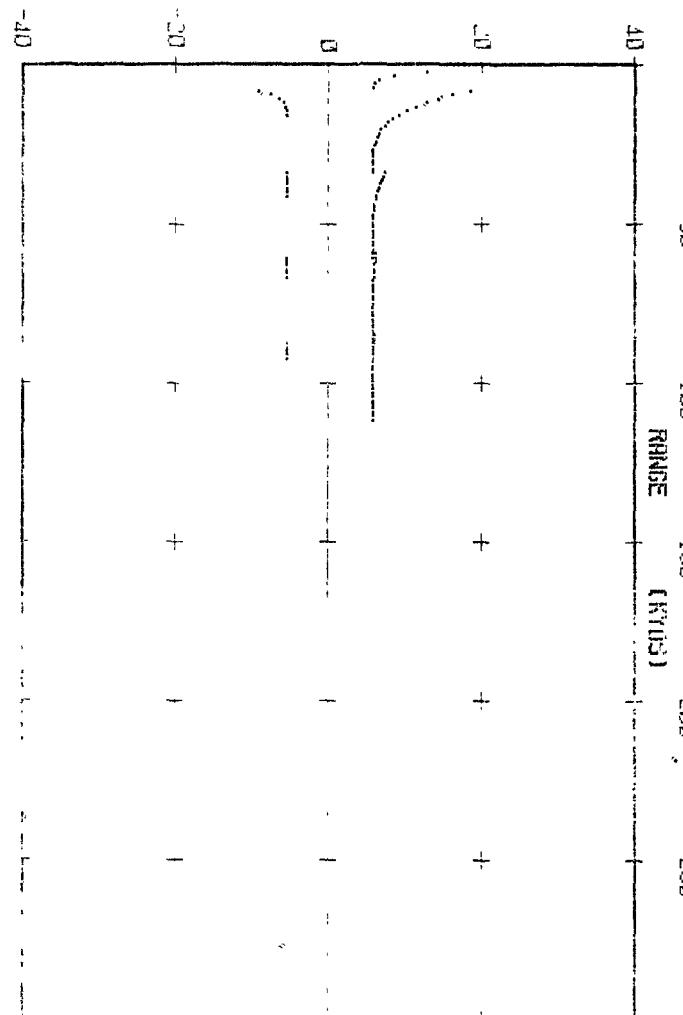
NOISE (DB)



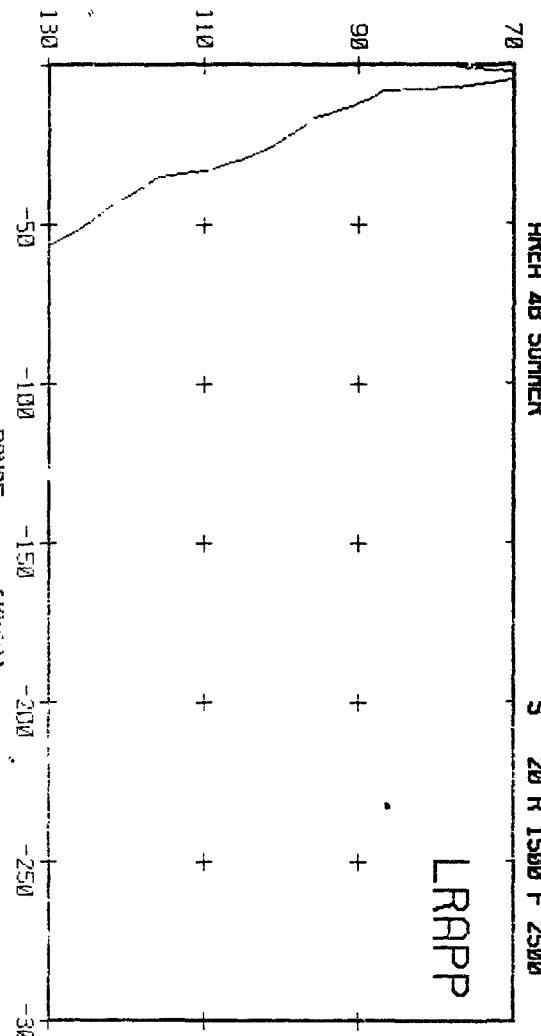
TOTAL -45.8 DB

-231-

## ARRIVAL ANGLE



## DB LOSS

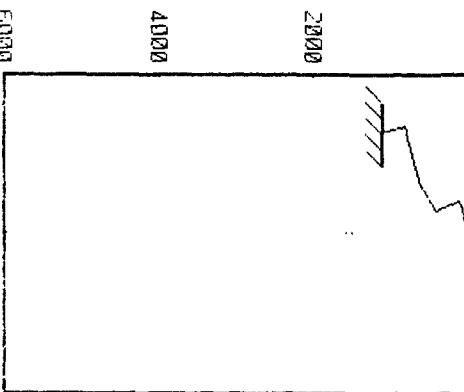


LRAPP

AREA AB SUMMER S 20 R 1500 F 2500

1450 M/S 1500 1550

## NOISE (dB)



ARER 4B SUMMER

S 59 R 150 F 2500

1450 145 1500 1550

LFRHCP

DB LOSS

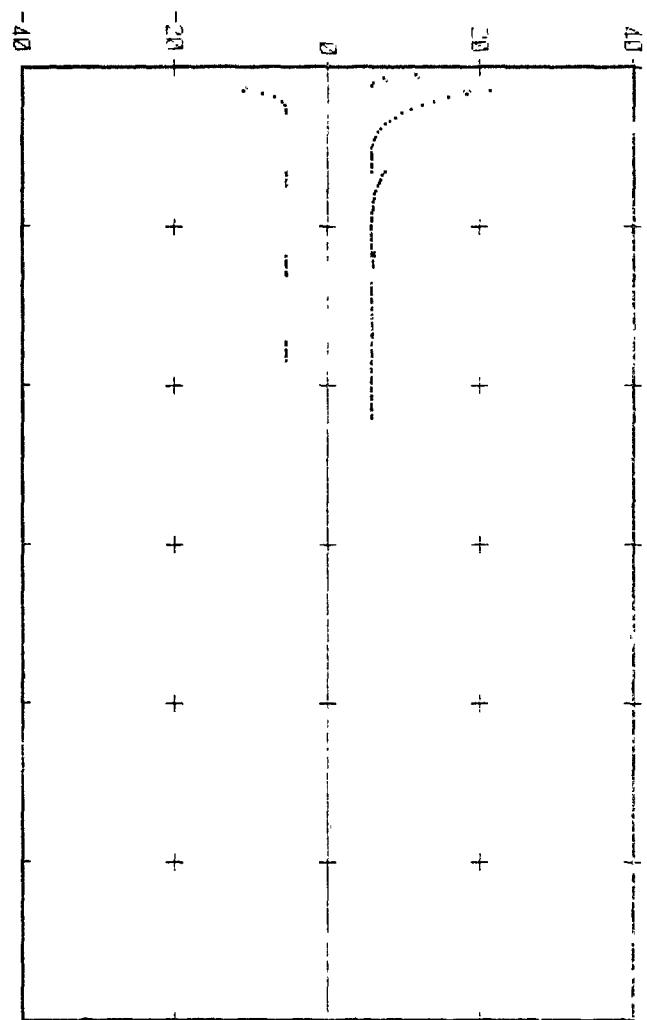
130  
110  
100  
-50  
-100  
-150  
-200  
-250  
-300

0  
2000  
4000

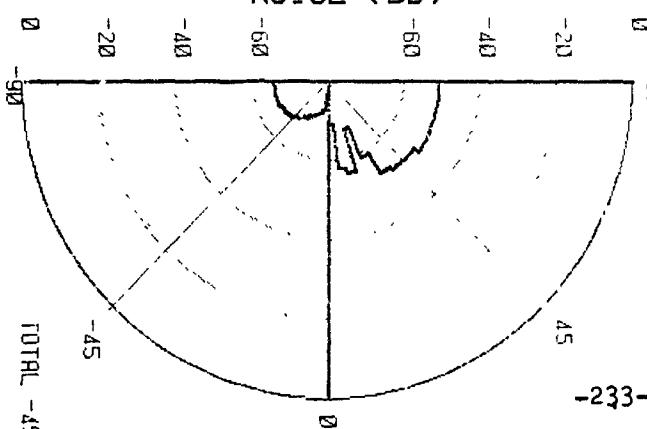
DEPTH IN METERS

2000  
4000

ARRIVAL ANGLE



NOISE (DB)



TOTAL -45.8 DB

70

AREA AB SUMMER

5

266 R 1500 F 7500

1450 M/S

1500

1550

## DB LOSS

90

110

130

150

170

190

210

230

250

270

290

310

330

350

370

390

410

430

450

470

490

510

530

550

570

590

610

630

650

670

690

710

730

750

770

790

810

830

850

870

890

910

930

950

970

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1010

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FIRST 4B SUMMER

S 20 R 2625 F 2530

1450 M/S

1500

1550

LRAPP

DB LOSS

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380

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DEPTH IN METERS

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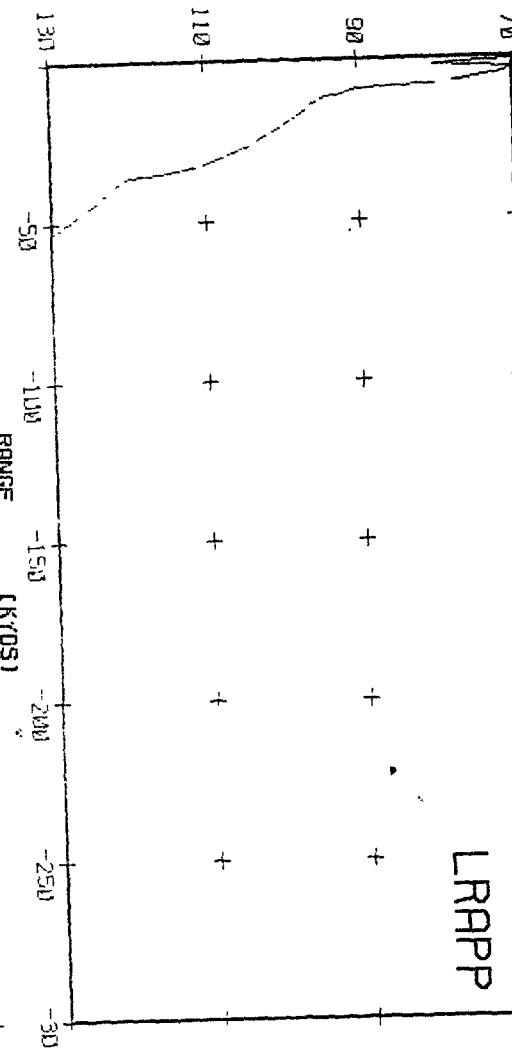
AREA 4B SUMMER

S 50 R 2625 F 2500

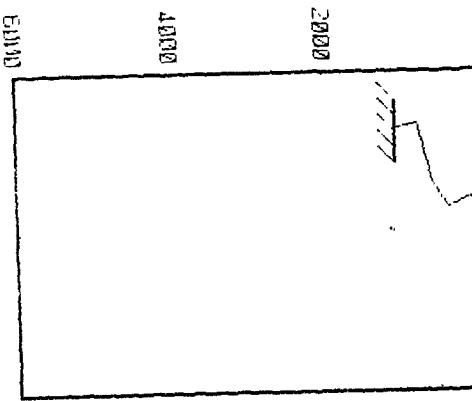
1450 11/5 1300 1550

LRAPP

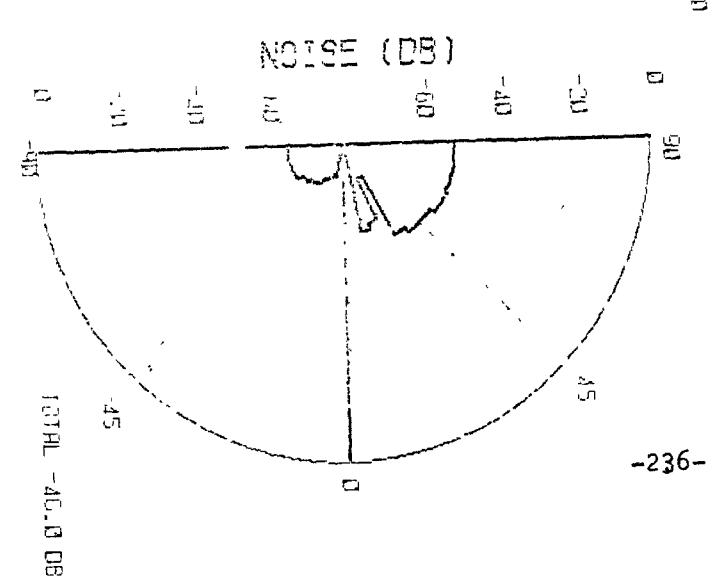
DB LOSS



DEPTH IN METERS

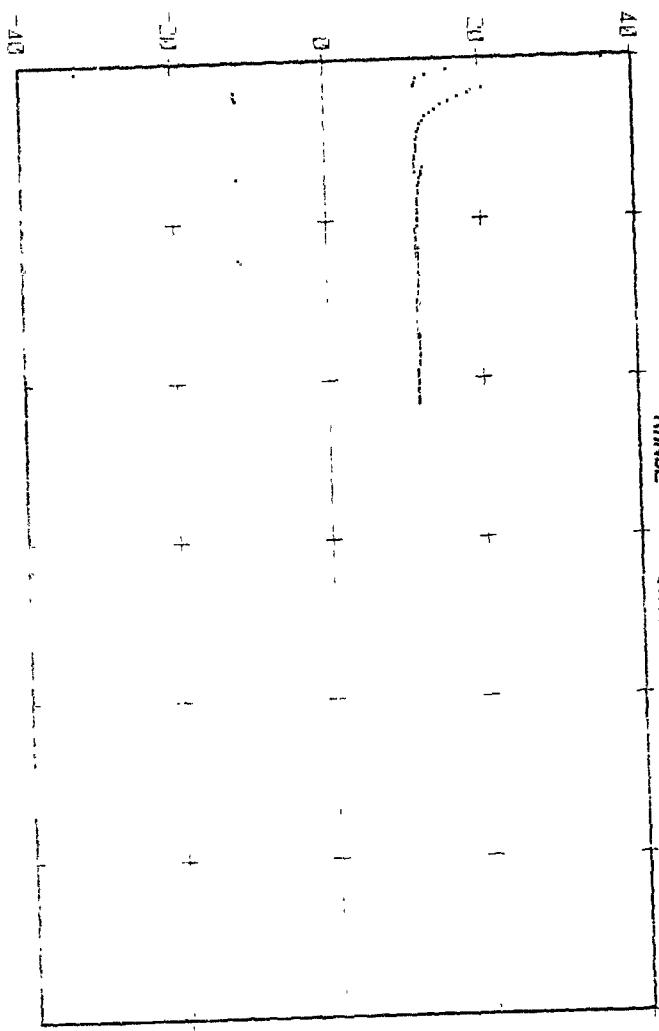


NOISE (DB)



-236-

ARRIVAL ANGLE



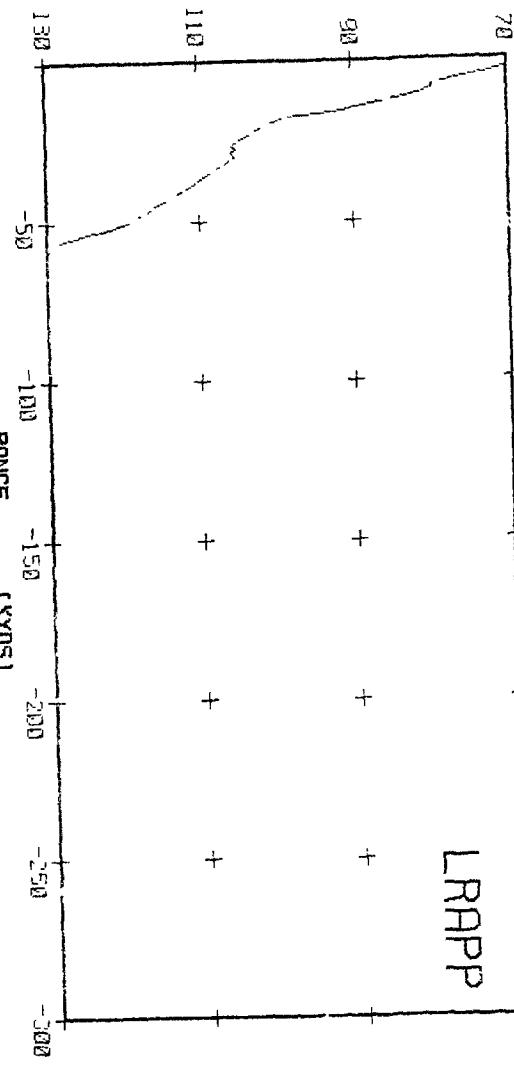
RIVER AB SUMMER

S 266 R 2625 F 2588

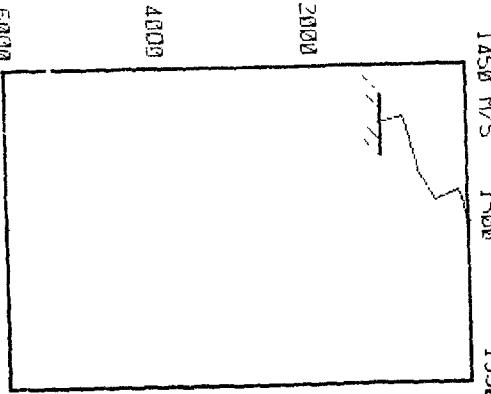
1450 M/S 1500 1550

LRAAPP

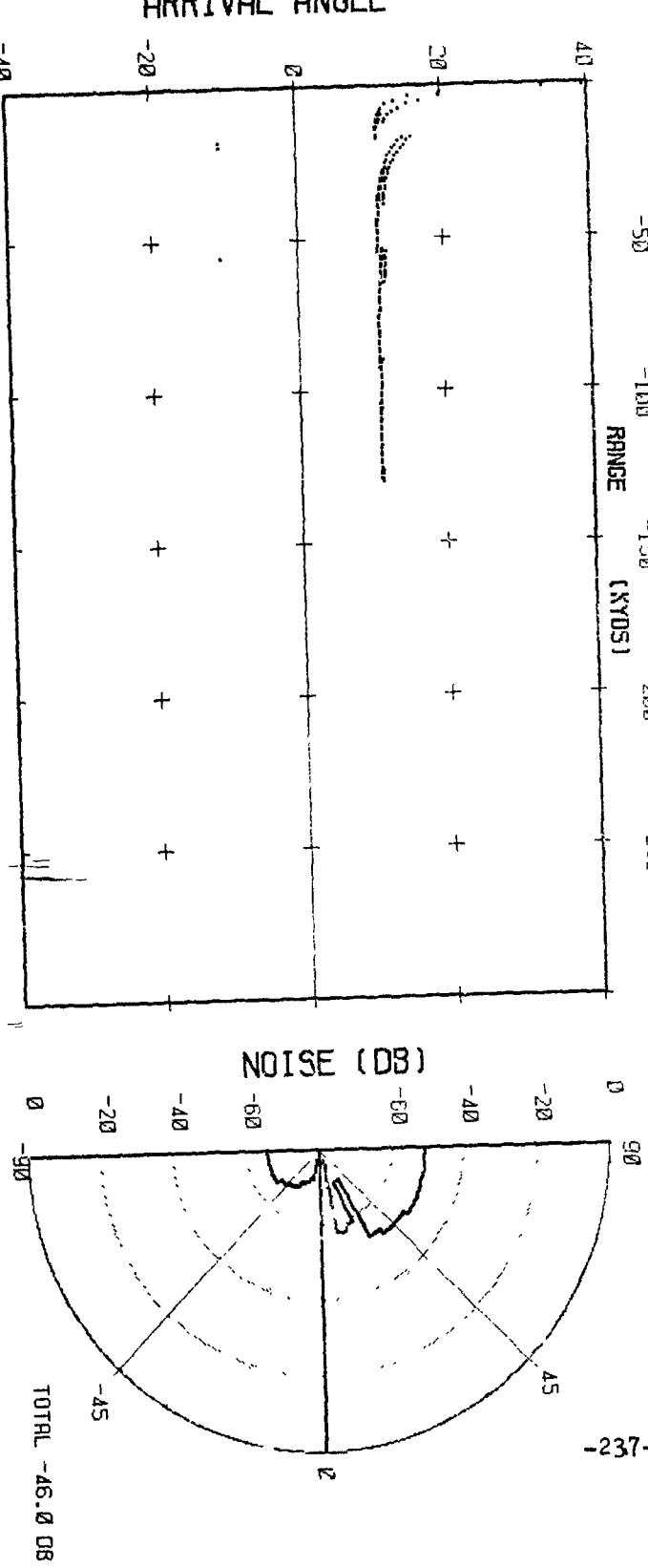
DB LOSS



DEPTH IN METERS



NOISE (DB)



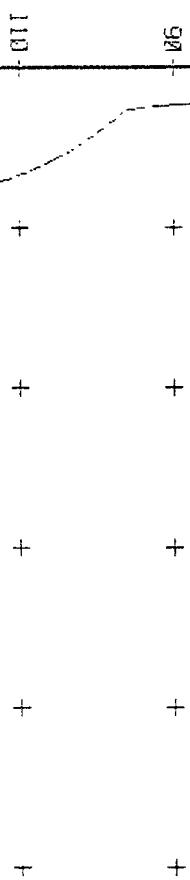
AREA AB SUMMER

S 20 R 3599 F 2500

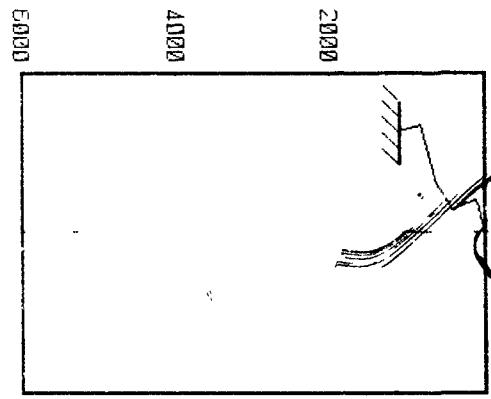
1450 M/S 1:00 1550

LRAAPP

DB LOSS

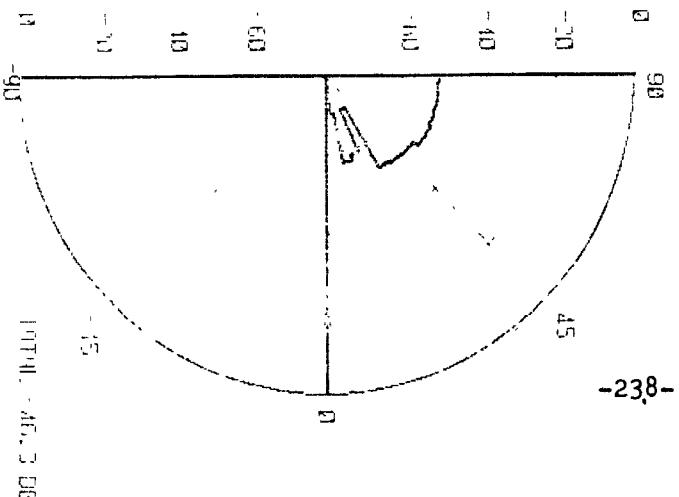
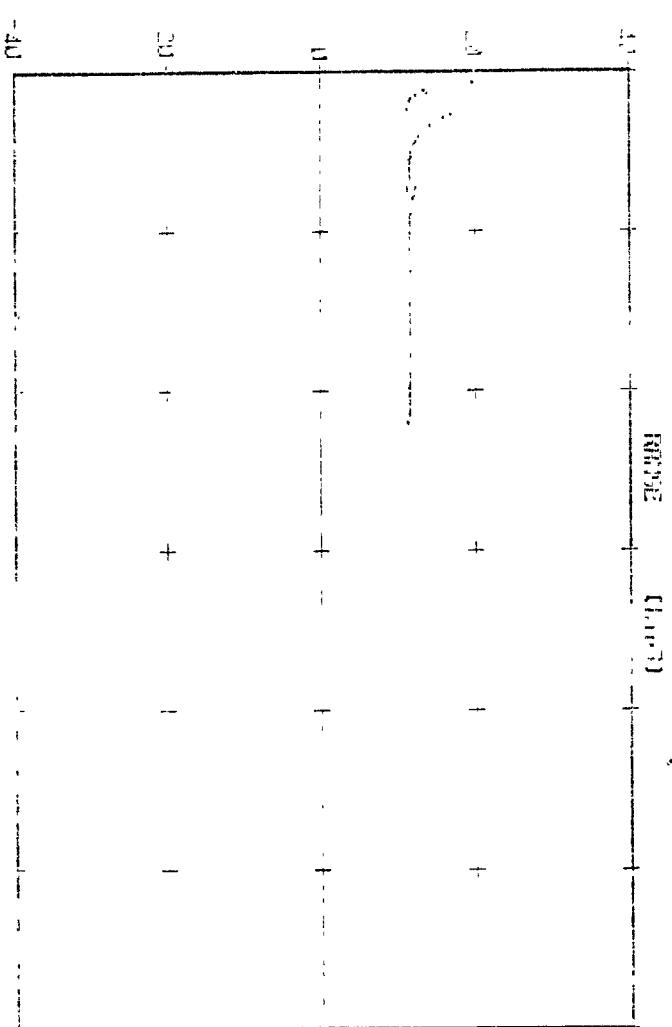


DEPTH IN METERS



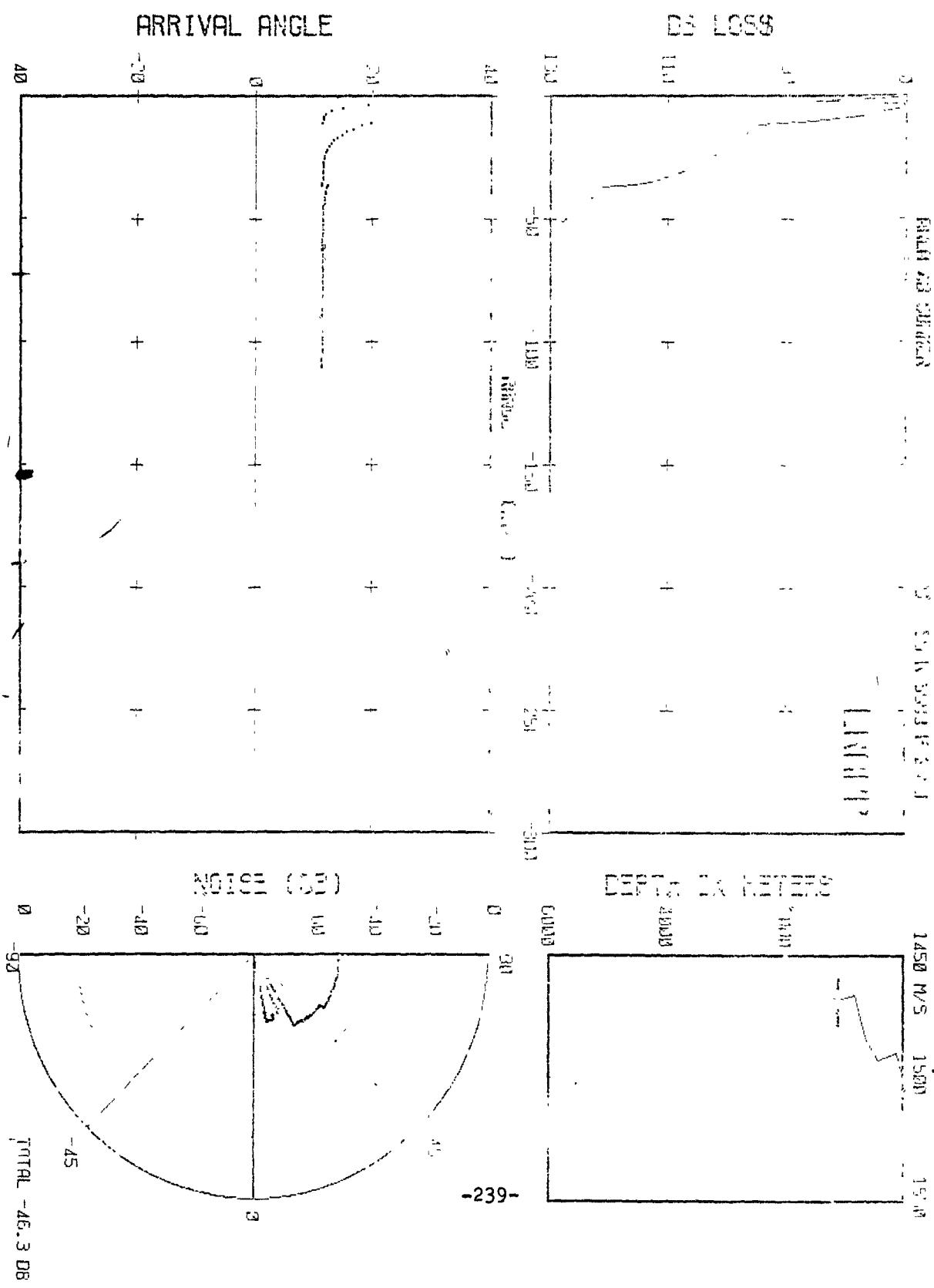
NOISE (DB)

ARRIVAL ANGLE



INTL. - 45, 3 DB

-238-

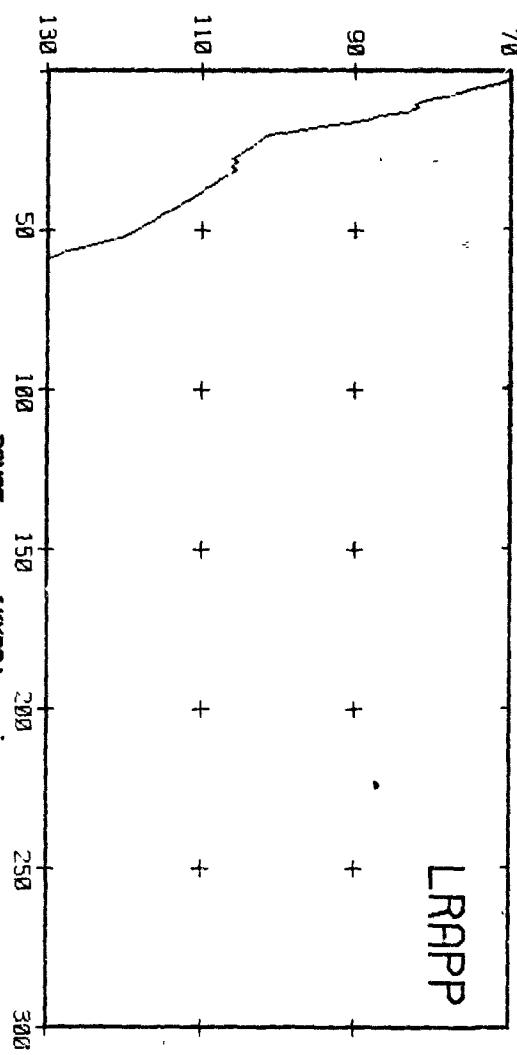


PRED AB SUMMER

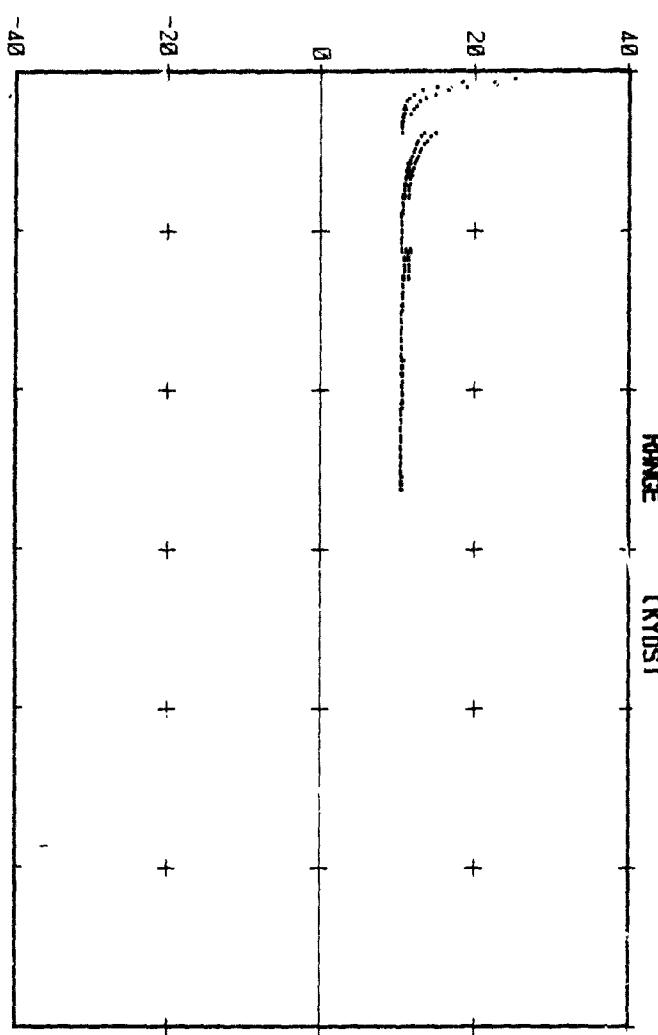
S 266 R 3599 F 2580

1450 M/S 1500 1550

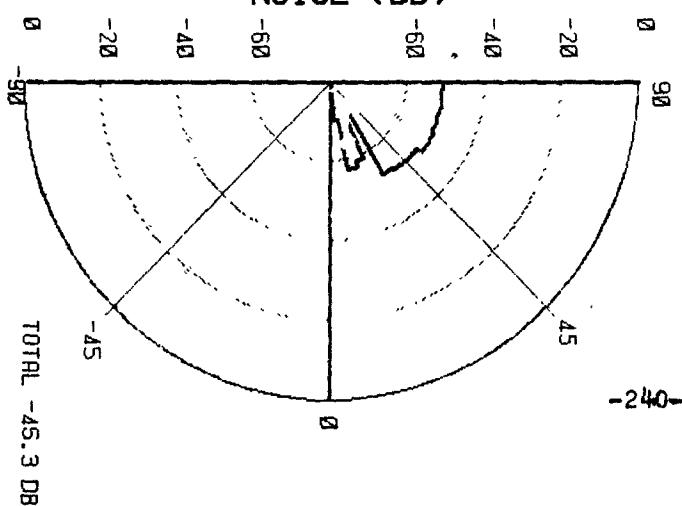
### DB LOSS



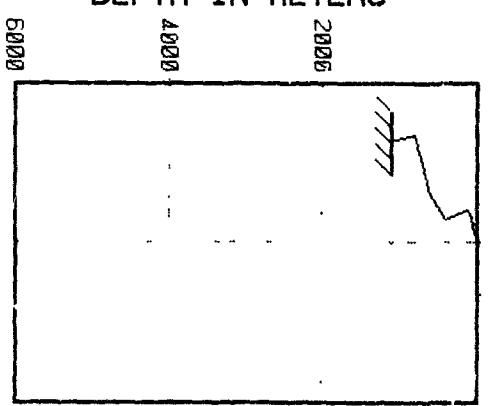
### ARRIVAL ANGLE



### NOISE (DB)



### DEPTH IN METERS



TOTAL -45.3 DB



**DEPARTMENT OF THE NAVY**

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IN REPLY REFER TO:

5510/1  
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31 Jan 06

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Subj: DECLASSIFICATION OF LONG RANGE ACOUSTIC PROPAGATION PROJECT (LRAPP) DOCUMENTS

Ref: (a) SECNAVINST 5510.36

Encl: (1) List of DECLASSIFIED LRAPP Documents

1. In accordance with reference (a), a declassification review has been conducted on a number of classified LRAPP documents.
2. The LRAPP documents listed in enclosure (1) have been downgraded to UNCLASSIFIED and have been approved for public release. These documents should be remarked as follows:

Classification changed to UNCLASSIFIED by authority of the Chief of Naval Operations (N772) letter N772A/6U875630, 20 January 2006.

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## Declassified LRAPP Documents

Report Number	Personal Author	Title	Publication Source (Originator)	Pub. Date	Current Availability	Class.
Unavailable	Unavailable	ACOUSTIC ENVIRONMENTAL SCENARIOS AND PREDICTIONS FOR ASW. VOLUME VII. AREA 3A SUMMER PREDICTIONS FOR PASSIVE SONAR	Maury Center for Ocean Science	721001	AD0910342	U
Unavailable	Unavailable	ACOUSTIC ENVIRONMENTAL SCENARIOS AND PREDICTIONS FOR ASW. VOLUME VIII. AREA 3B WINTER PREDICTIONS FOR PASSIVE SONAR	Maury Center for Ocean Science	721001	AD0910343	U
Unavailable	Unavailable	ACOUSTIC ENVIRONMENTAL SCENARIOS AND PREDICTIONS FOR ASW. VOLUME IX. AREA 3B SUMMER PREDICTIONS FOR PASSIVE SONAR	Maury Center for Ocean Science	721001	AD0910344	U
Unavailable	Unavailable	ACOUSTIC ENVIRONMENTAL SCENARIOS AND PREDICTIONS FOR ASW. VOLUME V. AREA 2 SUMMER PREDICTIONS FOR PASSIVE SONAR	Maury Center for Ocean Science	721001	AD0911224	U
Unavailable	Unavailable	ACOUSTIC ENVIRONMENTAL SCENARIOS AND PREDICTIONS FOR ASW. VOLUME XI. AREA 4A SUMMER PREDICTIONS FOR PASSIVE SONAR	Maury Center for Ocean Science	721001	AD0912560	U
Unavailable	Unavailable	ACOUSTIC ENVIRONMENTAL SCENARIOS AND PREDICTIONS FOR ASW. VOLUME X. AREA 4A WINTER PREDICTIONS FOR PASSIVE SONAR	Maury Center for Ocean Science	721001	AD0916556	U
MC-011 VOL. 14	Unavailable	ACOUSTIC ENVIRONMENTAL SCENARIOS AND PREDICTIONS FOR ASW. VOLUME XIV. AREA 5 WINTER PREDICTIONS FOR PASSIVE SONAR	Maury Center for Ocean Science	721001	AD0916557; ND	U
MC-011 VOL. 13	Unavailable	ACOUSTIC ENVIRONMENTAL SCENARIOS AND PREDICTIONS FOR ASW. VOLUME XIII. AREA 4B SUMMER PREDICTIONS FOR PASSIVE SONAR	Maury Center for Ocean Science	721001	AD0916610; ND	U
MCR008	Goodman, R. R., et al.	THE NEAT 1 EXPERIMENT (U)	Maury Center for Ocean Science	721001	NS; ND	U
Unavailable	Cherry, W. R.	LRAPP BEAMFORMER	Scripps Institution of Oceanography Marine Physical Laboratory	721015	ADA081876	U
ONR ACR-186	Gregory, J. B.	PROJECT LRAPP TEST BED- TECHNOLOGY USED IN THE DEVELOPMENT OF A DEEP-OCEAN STABLE PLATFORM (U)	Office of Naval Research	721024	AD09152370, ND	U
MC-010	Unavailable	CHURCH GABBRO EXERCISE PLAN- LRAPP (U)	Maury Center for Ocean Science	721026	ND	U
WHOI-72-87	Daubin, S. C., et al.	THE ACODAC SYSTEM	Woods Hole Oceanographic Institution	721101	AD0756628; ND	U
NRLR7516	Fleming, H. S., et al.	PROJECT NEAT 1 ENVIRONMENTAL DATA REPORT (U) (USNS J.W. GIBBS)	Naval Research Laboratory	721129	AD NS 523746	U